CONVENTION ISSUE

INFORMATION LETTER

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Proceedings of the 51st Annual Convention

NEWS SUMMARY

THE FORMAT of N.C.A.'s 51st Annual Convention produced three general sessions. Each is reported in detail, and public addresses are reproduced:

Annual Meeting, with election of Officers and Directors, Convention Resolutions, and addresses by Roscoe Drummond and Bernard M. Shanley ..... pp. 17-27
Marketing Session ..... pp. 28-40
Research Session ..... pp. 41-48

LUNCHEON MEETINGS covered subjects of special interest to selected groups. All of the papers made available for publication are presented:

Measuring Quality Factors .. pp. 49-55
Sanitation of Canning Equipment ..... pp. 56-65
Fishery Products Conference pp. 66-70

THE N.C.A. BOARD OF DIRECTORS heard H. Thomas Austern on "Sputniks, Science, and Survival" ..... p. 71
and, at a closed session, acted on Association business ..... p. 16

CANNER-GROWER RELATIONS received attention in Convention Resolutions ..... p. 20
and in a report to the Board by P. K. Shoemaker, Chairman of the Canner-Grower Coordinating Committee ..... p. 74

Major improvements over former Conventions noted by observers at the 51st annual meetings of the National Canners Association and Canning Machinery and Supplies Association, in Atlantic City, January 19-22:

(1) Business was exclusively canned foods activity—whether sales, production, programs, or promotions.

(2) Sufficient "elbow room"—telephone and other hotel services were prompt; it was not necessary to queue up for elevators or meals.

(3) Greater availability of the most desirable qualities of rooms and suites, since there were fewer claimants.

(4) Higher percentage of "finished business"—fulfillment of sales contact appointments.

Attendance was reduced by approximately the figure represented in former years by non-canned food principals and non-canned food brokers, or about 7,000 fewer people in Atlantic City during the Convention period. Recorded registrations came to nearly 7,000, and an estimated 2,000 to 3,000 transients came into Atlantic City from nearby points for only a day and were not housed in hotels and motels. This quantity of transient attendance is normal over a five-day period in either Chicago or Atlantic City.

Although the National Food Brokers Association did not participate as an association co-sponsor of the gathering this year, having held a separate meeting in mid-December with non-canner principals in chief attendance, many canned food brokers and buyers were present, and there was active participation by individua's or

N.C.A. Officers

(left to right)

Carlos Campbell, Executive Secretary; A. Edward Brown, 1957 President; Edward E. Burns, 1958 President; and Norman O. Sorensen, Vice President

At the second annual N.C.A. Convention Banquet A. Edward Brown receives a gift from the Association in appreciation of his service as N.C.A. President. The presentation was made by Donald P. Loker, master of ceremonies at the Banquet, which was attended by more than 600 from the canning and allied industries. Entertainment was furnished by Jan McArt, talented soprano from the San Francisco Opera Company; The Chords, instrumentalists without instruments; and Jack Russell, well-known baritone star of television.

groups of both categories. A leading food broker was a principal speaker on the Tuesday Marketing Session; a leading chain store executive was honored by a special award from N.C.A. for valuable contributions to the Philadelphia Project, a continuous marketing study under the Association's Consumer and Trade Relations Program; brokers of the Alton Canning Company specially honored E. E. Burns on his election as 1958 President of N.C.A.; and brokers and buyers were present and active at the affairs of the Young Guard and Old Guard Societies.

The N.C.A. Convention Committee invites and welcomes reactions and opinions about the 1958 Convention, from all categories—canners, brokers or buyers. At this writing the mail is "favorable."

Two innovations in Convention procedure this year were a new form of Directory, and the institution of Convention registration and badges, a practice never attempted by N.C.A. before. The registration procedure was the cooperative effort of C.M.&S.A., N.C.A., and the Atlantic City Convention Bureau. On checking in at each of the seven principal Boardwalk hotels, individuals were given a notice that registration at desks nearby, manned by Convention Bureau personnel, would service them with a badge, indicating canner, broker, buyer, supplier category; with a complimentary ticket to "Musical Memories," the Sunday night musical performance donated by C.M.&S.A., at the Warner Theater; and copy of the official Convention Directory and Program. Notices of other registration locations also were posted, these including the Information Desks at the Traymore and at Convention Hall.

The official Directory, as edited and produced by the Information Division staff from compilations by the Treasurer's Office and C.M.&S.A., was completely changed in format this year. It contained an A to Z listing of individuals, firms, and combinations of same, enabling users to find any person or firm listed without going to the departmentalized sections of canners, brokers, suppliers which have characterized previous directories. Another innovation was a "classified section" on different colored paper. This "new look" directory ran to 44 extra pages of listing over the 1957 Directory. Printing cost was met by the Convention Bureau, with a paid-advertising assist from *This Week Magazine*, saluting the accomplishments of the N.C.A. membership.

There were three general sessions at this year's Convention—the Opening General Session, including the N.C.A. Annual meeting; the Marketing Session; and the Research Session, which combined subject matter from both field and laboratory research. All but the latter enjoyed full attendance. President A. Edward Brown presided over the first two of these sessions, but

(Please turn to page 78)

Board of Directors Acts on Association Business

The Convention meeting of the N.C.A. Board of Directors on January 19 was in two parts—an open session including luncheon, with H. Thomas Austern, Association Counsel, and P. K. Shoemaker, Chairman of the Raw Products Committee, as speakers (pages 71 to 75), followed by an executive session for N.C.A. business.

Finance Committee Chairman W. U. Hudson presented the financial report, recommending a 1958 budget of $1,415,186, deficit, if any, to be taken from reserve funds, and the budget to be reviewed at the May Board meeting. The Board so moved.

The Board voted to continue membership dues at the current rate—4/10 of a cent per case for seasonal items and 2/10 of a cent per case for nonseasonal.

Executive Secretary Campbell's report was an explanation of the published Annual Report of the Secretary, designed to show what is being done by the various departments of the Association. Mr. Campbell stated that further detailed particulars will be supplied on request. He commended the work of Fred van Horsten, Manager of the N.C.A. Mail and Duplicating Section, in creating the graphics and in physically reproducing the Report. Mr. Brown commended the report and urged Directors to read it closely.

R. B. Heiney of the staff reported for the Procurement Committee and read the official resolution which was presented to the full membership the next day (page 20).

President Brown reported on the recommendation for consolidation of the Consumer Service and Consumer Trade Relations Committees, pointing out that study by the officers revealed the functions of these committees were a great deal more different than was thought. The Budget Committee preferred to keep the budgets separate for better supervision. Members of the respective committees had been canvassed and majority opinion favored keeping them separate. It was the unanimous recommendation of all three committees that the Board be requested to rescind its action of last May and reinstate the Committees as separate units. The Board voted to rescind.

Arthur H. Noble reported that the Indiana association at its recent annual meeting passed a resolution requesting N.C.A. to cooperate more closely with the USDA grading service. Secretary Campbell stated that the resolution had been referred to the Labeling Committee which had not had an opportunity to meet and give its recommendation. As soon as that has been done and the Board has the benefit of that Committee's recommendation, the complete discussion of the proposal will be scheduled.

ANNUAL MEETING

PRESIDING: A. EDWARD BROWN, 1957 President of N.C.A.

GREETINGS: Mr. Brown, President

ADDRESS: "State of the World"—ROSCOE DRUMMOND, New York *Herald-Tribune* Syndicated Columnist

REPORT of the Nominating Committee: GEORGE B. MORRILL, JR., Burnham & Morrill Co., Portland, Me., Chairman

ELECTION of 1958 N.C.A. Officers

REPORT of the Resolutions Committee: ROBERT A. FRIEND, Friend Brothers, Inc., Melrose, Mass., Chairman

ADDRESS: "Inside the White House"—BERNARD M. SHANLEY, Newark, N. J., former Counsel and Secretary to President Eisenhower

President's Greetings to Convention Delegates

By A. Edward Brown,
1957 President,
National Canners Association

I welcome you to this important Annual Meeting of the Association. I am sure that you will find this to be an unusually interesting and informative Convention. I call your attention to the three general sessions of which this is the first. All of them are important and you should plan to attend.

I had contemplated giving a brief review of the activities of the Association during the past year, but after reading the Report of the Secretary I find that the work of the Association has been set forth in detail in this Report which will be mailed to your office. I recommend to each of you a careful reading of this Report. It will give you a fine picture of the work of the Association in its various fields.

One of the things which is uppermost in the minds of canners around the country is the state of the economy and business conditions as they affect our industry. I received this morning a very interesting memorandum from Dr. H. L. Stier of the Association's Statistics Division, setting forth a number of factors which are deemed to be favorable to the marketing of canned foods:

The "gloom and doom" attitude of canners that has been prevalent during recent months is being replaced by cautious optimism. A number of events, during recent weeks, have contributed to the more optimistic outlook that canners now have for 1958. The strengthening of demand, which should be followed by an improved market for canned foods, indicates that there may now come a lessening of the cost-price squeeze that has reduced profits.

A. EDWARD BROWN
1957 President

The President's message to Congress, the request for additional funds ($1.26 billion) for defense contracts and the high level of retail sales are certainly favorable factors in the country's general economic situation. In addition to the high level of retail sales, the increase in sales of life insurance over a year ago indicates the purchasing ability and the psychological attitude of the consumer. This is the factor considered, by many economists, to be the key to the level of business activity during 1958.

More directly related to the fortunes of canners is the recent freeze in the South. The loss by freezing of substantial quantities of fruits and vegetables both for the fresh market and for processing has resulted in a strengthening of demand for the available supplies of certain canned foods. The effect upon the canned food market was reflected in a recent commodity analysis made by a well-known and highly regarded business service which indicated that if there was *any* change in prices of canned foods it would be upward during the near term. This was in contrast to the trend indicated for most of the other commodities included in this analysis.

Other *favorable* factors in the general business and economic situation are outlays for public works construction running ahead of a year ago by about 12 percent, an all-time high in electric power output (about 3 percent above a year ago), the higher rate of private housing starts, the increase in expenditures for road construction, the high level of paperboard production and easier money.

1959 Convention

The N.C.A.'s 52d Annual Convention is scheduled for Chicago approximately the third week end of February, 1959.

Edward E. Burns Elected 1958 President of N.C.A.; Norm Sorensen Chosen Vice President; Directors Named

Edward E. Burns, president of Alton Canning Co., Inc., Alton, N. Y., was elected 1958 President of the N.C.A.

He succeeds A. Edward Brown, vice president of Michigan Fruit Canners, Inc., Benton Harbor, Mich.

Norman O. Sorensen, chairman of the board of Country Gardens, Inc., Milwaukee, Wis., was elected 1958 Vice President.

Carlos Campbell of Washington, D. C., was continued in office as Executive Secretary-Treasurer.

The N.C.A. membership elected 23 Directors to new terms and 2 to fill unexpired terms; the terms of 44 members of the Board of Directors were held over.

President Burns, Vice President Sorensen, and the newly-elected Directors were the unanimous choice of the Nominating Committee, of which George B. Morrill, Jr., was chairman. Mr. Sorensen's nomination was put forward on behalf of the Wisconsin canners by Dr. T. O. Goeres of Lodi Canning Co.

Edward E. Burns

Edward E. Burns entered the canning business in 1927. His father was already in the dried apple business, and together they established the Alton Canning Co., Inc., for the production and sale of canned applesauce.

EDWARD E. BURNS
1958 President

The new firm expanded and added new lines and today packs a wide variety of canned fruits and vegetables.

Mr. Burns served during World War II as a member of the Canned Fruit and Vegetable Industry Advisory Committee to the OPA and during the Korean war in the same capacity with the OPS. Also, he was a member of Governor Dewey's Migrant Labor Advisory Committee for New York State.

Mr. Burns also is a director of the Sodus Cold Storage Corporation, a fruit and vegetable public storage warehouse, and of the Alling-Lander Co., Inc., of Sodus, machine tool manufacturers. He is treasurer of Hopkins of Sodus, Inc., a fruit freezing operation. He also is principal stockholder of a large-scale fruit and vegetable farming operation, known as Burns Farms, Inc., in Wayne County.

Mr. Burns was born in Wayne County, N. Y., July 22, 1903. He was graduated from Dartmouth College, where he studied business administration, in 1925.

He has been active in the affairs of the N.C.A. and the New York State Canners and Freezers Association. He is a past president of the New York association and served on a number of its committees. He was a member of the N.C.A. Raw Products Committee, 1948-50; the Claims Committee, 1952-54; the Statistics Com-

N.C.A. Board of Directors

At the Annual Meeting the N.C.A. membership elected 23 to three-year terms on the Board of Directors and 2 to fill unexpired terms. Together with 44 holdover members, following is the Board as now constituted:

DIRECTORS ELECTED FOR A THREE-YEAR TERM

A. L. Bilgore, David Bilgore & Co., Inc., Clearwater, Fla.
J. Burleigh Crane, Jasper Wyman & Son, Millbridge, Maine
A. L. Desmond, F. E. Booth Co., Inc., San Francisco, Calif.
James R. Draper, Draper Foods, Inc., Milford, Del.
Irving Goldfeder, Hunt Foods, Inc., Fullerton, Calif.
George Gooding, California Packing Corp., San Francisco, Calif.
Henry M. Haserot, Jr., Hawaiian Canneries Co. Ltd., Kapaa, Kauai, Hawaii
S. F. Hammond, Stokely-Van Camp, Inc., Celina, Ohio
Henry G. Hohwiesner, Starr Foods, Inc., Salem, Ore.
Dale G. Hollenbeck, Thornton Canning Co., Lodi, Calif.
Edwin C. Kraus, Big Stone Canning Co., Ortonville, Minn.
J. B. Park, Brandywine Mushroom Co., West Chester, Pa.
Robert Pollock, H. J. Heinz Company, Pittsburgh, Pa.
H. R. Robinson, Robinson Canning Co., Inc., New Orleans, La.
C. A. Shuttleworth, Shuttleworth Foods, Inc., Warren, Ind.
Victor R. Smith, Smith Canning Co., Clearfield, Utah
William H. Stare, Stokely-Van Camp, Inc., Columbus, Wis.
Joe M. Steele, Steele Canning Co., Springdale, Ark.
D. Thompson Swing, D. Thompson Swing, Inc., Ridgely, Md.
A. O. Verbeke, Libby, McNeill & Libby, Chicago, Ill.
Robert D. Waterman, Manchester Foods, Inc., Ontario Center, N. Y.
Harlow Waggoner, Santa Clara Packing Co., San Jose, Calif.
Fred T. Wright, Beaver Valley Canning Co., Grimes, Iowa

DIRECTORS ELECTED TO FILL UNEXPIRED TERMS

Hal M. Chase, Hawaiian Pineapple Co., Ltd., San Jose, Calif.
S. G. Tarrant, Pacific American Fisheries, Inc., Bellingham, Wash.

DIRECTORS WHOSE TERMS HELD OVER

W. F. Allewelt, Jr., Turlock Cooperative Growers, Modesto, Calif.
Aubin R. Barthold, Alaska Packers Association, Seattle, Wash.
John L. Baxter, Jr., Snow Flake Canning Co., Hartland, Maine
Roger E. Brickman, Illinois Meat Co., Chicago, Ill.

mittee, of which he was Chairman, 1954-56; and the Convention Program Committee which made plans for the 1958 Convention.

He is active in community affairs, as a director of the Lyons Hospital and of the Sodus Community Hospital, as chairman of the Wayne County Cancer Society Drive, and in apple and cherry festivals.

NORMAN O. SORENSEN
1958 Vice President

Norman O. Sorensen

Norman O. Sorensen was born into the canning industry at Gillett, Wis., in 1905. He is the son of the late H. C. Sorensen, who was one of the founders of the Gillett Canning Company at Gillett and the Coleman Canning Company at Coleman.

He had his schooling in the public schools of Gillett and at the University of Wisconsin, class of 1929, where he majored in commerce. During his student years he worked during vacations and holidays around his father's plants. His first experience in canning was as a water boy to the field harvesters.

Following graduation from college, Mr. Sorensen worked in the new canned meat department of the Geo. A. Hormel & Co. in Austin, Minn., but after his father died in 1932 he returned to the family properties and took over the management of both the Gillett and Coleman plants. In 1939 Mr. Sorensen formed Country Gardens, Inc., and for 11 years managed the three properties as separate canning enterprises. In 1950 the Gillett and Coleman operations were merged into the Country Gardens enterprise, of which Mr. Sorensen served as president until 1956, when he became chairman of the board.

Mr. Sorensen has taken a leading part in the affairs of both the Wisconsin Canners Association and the N.C.A. He has served as president of the Wisconsin association, as a member of the N.C.A. Board of Directors and on its War Planning Committee, Labeling Committee, and Consumer and Trade Relations Committee, of which he was Chairman in 1956 and 1957. During World War II he was a canning industry representative in the Processed Fruit and Vegetable Section of the OPA.

CARLOS CAMPBELL
Executive Secretary-Treasurer

C. C. Cadagan, Maui Pineapple Co., Ltd., Maui, T. H.
C. H. Carlson, Burnette Farms Packing Co., Hartford, Mich.
Shell R. Clevenger, Bush Bros. & Co., Dandridge, Tenn.
A. E. Coddington, Jr., Coddington Packing Co., Inc., Mt. Comfort, Ind.
Ben F. Counter, Fort Lupton Canning Co., Fort Lupton, Colo.
W. T. Creamer, New Vienna Packing Co., Wilmington, Ohio
Robert W. Earle, S. & W. Fine Foods, Inc., Redwood City, Calif.
Robert A. Friend, Friend Brothers, Inc., Melrose, Mass.
Leo M. Gleason, G & M Food Products Co., Des Moines, Iowa
Henry W. Hartle, Owatonna Canning Co., Owatonna, Minn.
Robert Hutchinson, Michigan Fruit Canners, Inc., Fennville, Mich.
Frank A. Jugler, South Ogden Products Co., Ogden, Utah
William J. Kiefer, John W. Taylor Packing Co., Hallwood, Va.
M. E. Knouse, Knouse Foods Cooperative, Inc., Peach Glen, Va.
Horace Larkin, Rochelle Asparagus Co., Rochelle, Ill.
Dougald MacDonald, Burnham & Morrill Co., Portland, Maine
Robert C. McCracken, Treesweet Products Co., Santa Ana, Calif.
Thomas D. McGinnes, Virginia Seafoods, Inc., Irvington, Va.
W. Allen Markham, Markham Bros. & Co., Okeechobee, Fla.
Norman W. Merrill, Blue Lake Packers, Inc., Salem, Ore.
Francis J. Miller, Curtice Brothers Co., Rochester, N. Y.
Parker Mitchell, Jr., F. O. Mitchell & Bros., Perryman, Md.
Ivan Moorhouse, Olympia Canning Co., Olympia, Wash.
Arthur H. Noble, Ray Bros. & Noble Canning Co., Inc., Hobbs, Ind.
Robert L. Peterson, Big Horn Canning Co., Cowley, Wyo.
Albanus Phillips, Jr., Coastal Foods Co., Cambridge, Md.
Montgomery Phister, Van Camp Sea Food Co., Inc., Terminal Island, Calif.
E. E. Richard, H. J. Heinz Company, Bowling Green, Ohio
Thomas Richards, Jr., Bercut-Richards Packing Co., Inc., Sacramento, Calif.
Alfred Rieck, Tripoli Canning Co., Tripoli, Iowa
M. F. Smith, San Juan Island Cannery, LaConnor, Wash.
E. W. Sterr, Loyal Canning Co., Loyal, Wis.
T. E. Stinson, Alamo Products Co., Alamo, Texas
G. S. Suppiger, Jr., Brooks Foods, Inc., Collinsville, Ill.
William Varney, Varney Canning, Inc., Roy, Utah
Gordon J. Verhulst, Calumet-Dutch Packing Co., Sheboygan, Wis.
Norman L. Waggoner, Jr., Olney & Carpenter, Inc., Wolcott, N. Y.
Alan Warehime, Hanover Canning Co., Hanover, Pa.
Newlin B. Watson, R. S. Watson & Son, Greenwich, N. J.
J. Edward White, White Packing Co., Vienna, Ga.

N.C.A. Resolutions Cite Common Interest with Growers and Reaffirm Industry Opposition to Marketing Orders

The community of interest between growers and canners was officially acknowledged by the N.C.A. membership in a resolution adopted at the Annual Meeting.

The resolution recognizes that both growers and canners have come to appreciate the part played by each, and to understand that these problems can be solved by unrestrained freedom of choice and activity for each.

The N.C.A. also reaffirmed industry-wide opposition to federal marketing order controls.

The Convention resolutions were presented by Robert A. Friend, Chairman of the Resolutions Committee, and were adopted unanimously.

Following is the text of the Convention resolutions:

Community of Interest Between Grower and Canner

Through an established tradition of constant cooperation, the grower and the canner together have been able to cope with the inescapable hazards of nature and the other complex problems encountered in supplying the consumer with an abundant supply of high quality canned fruits and vegetables. Continued recognition of this community of interest is essential for the efficient performance of the many tasks incident to growing, harvesting, processing, and effective marketing of these products. Both growers and canners have come to appreciate the part played by each, and to understand that these problems can be successfully solved by an unrestrained freedom of choice and activity for each. Together the canner and the grower can anticipate the continuing benefits to be obtained from mutual respect and cooperation within a system of economic freedom for both.

Food Additive Legislation

The public interest requires that every new food additive, whose safety and wholesomeness has not been determined, be adequately pretested prior to use. While the present or potential use of untested food additives is not an immediate problem for the canning industry, this Association, as a responsible segment of the food industry, favors the enactment of sound legislation to ensure adequate pretesting. It vigorously opposes any administrative licensing system for new food ingredients as contrary to the basic structure of the Federal Food, Drug, and Cosmetic Act and as creating unwise and unwarranted impediments to technological improvement. It opposes any administrative control on the basis of the functional value, as distinguished from the safety, of what the American consumer may eat. It insists that there be realistic and fair court review of administrative action asserted to be unfounded or unlawful. The Association urges upon the Congress the prompt enactment of sensible, constructive legislation as exemplified in the Harris Bill, H. R. 8390, and the Wolverton Bill, H. R. 8629, as affording abundant public protection and yet avoiding any system of unfettered licensing or bureaucratic control of the American diet.

Mandatory Federal Marketing Orders

A free economy in a free nation reflects the independent judgments of its individual citizens. The eminent position of the canning industry in the American economy and its splendid contributions to the American consumer derive from its record of production, constant development, and increased efficiency that can be achieved only under a system of free enterprise. Federal marketing orders infringe upon that freedom of operation. Any system of regimented controls that denies to the individual canner or particular producing area the flexibility and economic incentives necessary to innovation and better production disserves the public, the growers, and the industry. This Association continues vigorously to oppose any extension to canning crops of involluntary and mandatory marketing orders.

Government Procurement

As a national trade association serving the canning industry as a whole the National Canners Association recognizes no distinctions in the size, location, or scope of operations of any processor. Yet so long as the Armed Services, in the procurement of essential canned foods, continues in response to Congressional mandate to segregate those who bid into categories of large and small business concerns, the Association vigorously urges that the canners within each group be permitted freely to compete in selling their products to the Government. It opposes any system of preferential bidder qualification as unfair, unduly costly, and contrary to the public interest. It therefore urges upon the Department of Defense the re-establishment of the time-tested and equitable buying procedures formerly utilized.

Interstate Barriers

Consumer interest in both effective competition and the widest availability of all food products necessitates that any informatively labeled wholesome food be permitted to be sold freely throughout the United States. State or local regulations that impose requirements needlessly extending the adequate protections afforded by federal law serve only to hamper and to impede the free interstate distribution of canned foods. The National Canners Association urges upon all state legislatures, administrative agencies, and local officials these paramount consumer interests. Any state or local regulation that specifies particularized labeling requirements, or prohibits ingredients authorized by federal law, or standardizes products to reflect local preferences, creates unwarranted interstate barriers and defeats the interests of consumers, canners, and growers alike.

Allied Trades

The annual packs of canned foods can be moved from field to consumer only through the efforts of many individuals and groups. Without this cooperation, the canning industry could not hope to fulfill its part in the production and distribution process. Among those who massively contribute to this impressive accomplishment are the food brokers, wholesalers, and retailers, State and Federal agencies, suppliers, communications media, and related trade associations. The National Canners Association acknowledges the contribution that each of these annually makes in effectively marketing its production.

Guest Speakers, Press, and Communication Media

A National Canners Association convention can be a success only through the cooperative efforts of many diversified groups. Our guest speakers, the allied trades, newspapers, radio, television and the trade press have contributed in large measure to the success of the 1958 convention. The Association appreciates all that they have done and directs the President and the Board of Directors to convey its gratitude to each of them.

A. Edward Brown

During 1957 the National Canners Association has been privileged to have as its President a man of steadfast purpose and energetic and effective leadership. A. Edward Brown has uniquely combined the analytical mind of the trained lawyer with the experience and judgment of the seasoned businessman. His previous long and unstinting services to the Association and the canning industry, both in periods of national crisis and in peacetime, enabled him to bring to the task of guiding the industry, a broad knowledge of its problems. His constant emphasis on the need for sound managerial skills and judgment, so abundantly exemplified in his own performance, has contributed new insights into the resolution of canning industry problems. Generosity in the

giving of his time and energy to his fellow canners, accompanied always with genial and quiet friendliness, has earned him the enduring gratitude of every member of this Association.

NATIONAL CANNERS ASSOCIATION STAFF

Greater production, broadened promotion efforts, and increased government regulations have constantly added to the responsibilities and burdens of the Association Staff. Successful accomplishment during 1957 again attests the devotion and efficiency of the men and women in each Division. The Association expresses its sincere appreciation to Carlos Campbell and his effective staff for their loyalty, diligence, and zeal in carrying out their assigned tasks.

IN MEMORIAM

The passing year inexorably takes its toll of those who have long served the canning industry and enriched the lives of their friends and colleagues at the conference table, the laboratory, the factory, and the market place. We mourn the loss during 1957 of

M. W. Baker
J. Willis Beidler
George A. Burnham
Charles A. Crawford
Kenneth K. Dean
Mrs. John W. Dulany
Herman B. Esselen
W. D. Hooper
Robert Y. Kerr
Harry MacConaughey
Harry A. Miller
Irving A. Nelson
James I. Smith, Jr.
Henry A. Verhulst

1958 Finance Committee

The personnel of the Finance Committee was approved at the Closing General Session. As announced by President Burns, it is as follows:

A. Edward Brown, Michigan Fruit Canners, Inc., Benton Harbor, Mich., *Chairman*.
H. J. Barnes, Kaysville Canning Corp., Kaysville, Utah
John L. Baxter, Snow Flake Canning Co., Brunswick, Me.
E. B. Cosgrove, Green Giant Company, LeSueur, Minn.
Howard T. Cumming, Curtice Brothers Co., Rochester, N. Y.
S. B. Cutright, The Illinois Canning Co., Hoopeston, Ill.
Ralph O. Dulany, John H. Dulany & Son, Inc., Fruitland, Md.
A. M. Erickson, Hawaiian Pineapple Co., Ltd., San Jose, Calif.
Peter M. Filice, Filice & Perrelli Canning Co., Richmond, Calif.
William H. Foster, Stokely-Van Camp, Inc., Oakland, Calif.
William A. Free, Sr., Hungerford Packing Co., Inc., Hungerford, Pa.
R. A. Friend, Friend Brothers, Inc., Melrose, Mass.
G. Sherwin Haxton, Haxton Foods, Inc., Oakfield, N. Y.
Fred C. Heinz, H. J. Heinz Company, Pittsburgh, Pa.
William U. Hudson, Gerber Products Company, Oakland, Calif.
Marc C. Hutchinson, Michigan Fruit Canners, Inc., Fennville, Mich.
Adolph C. Ketzler, Bordo Products Co., Chicago, Ill.
H. F. Krimendahl, Stokely-Van Camp, Inc., Indianapolis, Ind.
D. P. Loker, Star-Kist Foods, Inc., Terminal Island, Calif.
Roy G. Lucks, California Packing Corp., San Francisco, Calif.
John F. McGovern, Green Giant Company, LeSueur, Minn.
Ivan Moorhouse, Olympia Canning Co., Olympia, Wash.
George B. Morrill, Jr., Burnham & Morrill Co., Portland, Me.
Fred M. Moss, Idaho Canning Co., Payette, Idaho
Maxwell N. Naas, Naas Foods, Inc., Portland, Ind.
Louis Ratzesberger, Jr., The Illinois Canning Co., Hoopeston, Ill.
B. E. Richmond, Richmond-Chase Co., San Jose, Calif.
Emil Rutz, Schuckl & Co., Inc., Sunnyvale, Calif.
George C. Seybolt, Wm. Underwood Co., Watertown, Mass.
James M. Shriver, The B. F. Shriver Co., Westminster, Md.
Henry P. Taylor, Taylor & Caldwell, Inc., Walkerton, Va.
A. O. Verbeke, Libby, McNeill & Libby, Chicago, Ill.
H. L. Wedertz, Lakeside Packing Co., Manitowoc, Wis.
J. B. Weix, Oconomowoc Canning Co., Oconomowoc, Wis.
Oliver G. Willits, Campbell Soup Company, Camden, N. J.
Ray A. Yocom, Monarch Foods, Canners and Processors, River Grove, Ill.

Statement on Taking Office as President

(at the Second General Session)

By Edward E. Burns,
1958 President
National Canners Association

Each year, the Association honors some area of this country, some company, and some individual by electing that individual as its President. Let's say that I happened to be around at the opportune time to receive this honor.

I feel humble in being so recognized, because many other individuals of this industry take an active part in the many activities of the National Canners Association and are likewise deserving of such recognition. I want you to think of the Chairmen of the active Committees and the members of those Committees, who are unselfishly and diligently devoting their time and effort to the welfare of this Association. Such men are necessary to the success of our industry.

I pay tribute to many men—perhaps we should call them "old-timers"—who have devoted many years to the growth and honorable distinction of this Association and the industry it represents. Because of their devotion and integrity, we are a respected industry.

I have wondered what our business would be like today if it were not for the National Canners Association. I debate in my mind, at times, the immediate effect of the statistical reports of packs and stocks, but suppose there had never been a Statistics Division? Imagine our industry depending solely on others for scientific research. I wonder what the public would think of canned foods today, were it not for the work of the Claims Division, and the work of the Information Division. What if we did not have a Raw Products Research Bureau, which has helped industry personnel to make great changes in agricultural practices for canning crops? And suppose we had no medium for telling the consumer about our products; were without the Consumer Service Division and the Consumer and Trade Relations Program? What if we had no one watching out for our interests in the halls of Congress—the Legislative Committee.

I am merely repeating what all of you know, but I wish to focus your thoughts on an instrument which you have honored me to execute. I can execute it only with the continuous support of so many of you who have already given much. I ask that more of you join in this group effort for the good of the industry.

From the beginning, starting with the late Frank Gorrell and down

through only one other Executive Secretary, Carlos Campbell, our industry has been fortunate in having a loyal, aggressive staff located as we grew, strategically across our country. I feel secure with this active group working for our benefit and continued progress.

On taking office, I express my appreciation to all of those mentioned, anonymously perhaps, and to my immediate predecessors, Ed Brown and Bill Hudson, for their guidance. I am positive that I shall need much more advice and counsel.

Again, gentlemen, thank you. With God's guidance may we have a progressive year.

Statement on Taking Office as Vice President

(at the Second General Session)

By Norman O. Sorensen,
1958 Vice President,
National Canners Association

A vice president is most favorably known for the degree of anonymity he brings to the office.

He is even better liked if he keeps his speeches short.

I am determined to make a good start in this job with which you have honored me. Therefore, I want to say only that I am deeply grateful for the privilege of working with our fine new President. I am happy to be working with Ed Burns and I will be at his side whenever he needs me.

Carlos Campbell is doing far more than most of us realize to unify our widely-spread industry. This job goes on and on and on, regardless of changes in Association administrations. More than anything, I hope I can help him and his staff in this very necessary work to keep our Association strong.

State of the World

By Roscoe Drummond,
New York Herald-Tribune
Syndicated Columnist

At the risk of grievously offending this audience and of undermining your business, I have to say in expression of my own integrity and my own candor to you, that there is an aspect of canned goods which I am against. I don't like canned speeches and in many ways I really don't want to deliver a speech to you this morning. I want to talk out loud with you and think out loud with you. I believe pretty deeply that what this country most needs is less public speaking and more private thinking.

As a matter of fact, I would a good deal rather deal with your questions and be sure I am talking about what most concerns you than to speak at windy length myself. In fact, I suggest that I speak as briefly as possible and that we turn this into a Washington Press conference in reverse. You know how several hundred Washington correspondents file into the President's press conference room in the old State Department, approximately once a week, and endeavor to put the President on the spot. I am perfectly willing to have you put me on the spot and I will be happy to do my best to be as forthright and candid as possible. I wouldn't feel that I was fair to you if I didn't warn you that I have certain defenses. Having watched the political artisans at work in the White House for many years, it is just inevitable that some of their talent should rub off on us, perhaps by osmosis, and we acquire, even if reluctantly, a certain capacity to deal with questions without answering them.

Now, my thought was to begin the question period myself with the easier questions and leave the tough ones to you. I thought the easy questions that I would try to deal with in a relatively short compass would be questions like these:

How do we stand with the Soviets in military strength and what are the real dangers that confront us?

Is the President's $74 billion budget equal to the need and what is going to happen to it in Congress?

Do we run a serious risk of spending billions for missiles and only pennies for waging the peace?

What is the shape of the oncoming Congressional elections, who will be the Republican nominee in 1960, who will be the Democrats' nominee, who will win and why?

Those are the opening questions which I will take three or four minutes to answer, and then leave it with you to cross-examine me as seems appropriate.

It seems to me that it is possible and perhaps most useful to put the nature of the Soviet challenge to you in terms of the Rockefeller Report. Actually I think I can say with knowledge that the essential conclusions of the Rockefeller Report which came out two or three weeks ago are paralleled by the unpublished Gaither Report and that therefore the Rockefeller Report takes on special credence because it follows very closely the essential lines of thinking of the still classified Gaither Study.

The Rockefeller Report is saying to the American people and to Congress that the United States is now, not sometime in the future, losing its lead over the Russians in the military race. It is saying that while we still posseas a superiority in striking power at the moment, the world balance of power will shift in favor of the Soviet bloc unless present trends are reversed. It is saying that it is not too late if we are prepared to make the necessary decisions immediately, and it is saying that there will be no second chance, no opportunity to play the game over again if we lose.

I believe I can put the military picture to you much too simply perhaps, but I am going to try to do it in three sentences because I want to cover a lot of territory in the next 25 minutes. The essential facts seem to me to be these:

First, that in the area of military manpower, in the area of combat divisions ready and trained, the United States and the free world are overwhelmingly out-matched by the Soviet Army.

Second, in nuclear weapons we are stalemated and in the rate of progress in the weapons of the future, we are presently being out-distanced. That seems to me to be the position which the President outlined in his message to Congress last week.

I ask myself, what does this mean? What are the consequences if the Soviets widen or if they only keep their present leads in missiles and their stockpile of nuclear weapons? It will mean, of course, a shift in the balance of power and therefore it is important, I think, to try to see what we mean by a shift in the balance of power. I believe that it means not that the United States is in imminent peril of war but rather that the United States will be inviting exactly the same kind of diplomatic blackmail which Hitler practiced on Britain and France in the 1930's and practiced successfully. A shift in the balance of power will mean that the free world will be bluntly confronted with a whole series of diplomatic extortions from Syria to Viet-Nam, which we will very much want to resist but which we will be unable to keep other nations from yielding to, because we would have lost the power to guarantee their protection.

Finally, it means that if we permit the balance of power to remain long on the Soviet side, we will have lost the cold war because we will not have the military shield behind which to wait.

I do not at all wish to leave the impression—and I think the President performed a most useful service in his message to Congress by emphasizing that because the Soviets have gone ahead of us in some phases of the weapons of the future—that America is suddenly a weak and impotent country. That is not true in the least. By ourselves and with our NATO allies, we possess a military capability of a crippling reply. War can be made very unattractive to the Kremlin and I think it would be accurate to say that the deterrent of mutual terror still prevails.

The prime danger, then, of letting the Russians hold the lead in missiles is not that this would make war either safe or inviting for the Soviets. The prime danger is that our willingness to permit them to keep the lead would induce much of the world to believe that we have neither the will nor the means to resist. And therefore, such a permitted shift over any long period of time, or any considerable period—such a permitted shift in the balance of power would be absolutely devastating to the free world. I believe that it would be just about equal to drawing the dotted line for the political Munich which could precede World War III.

Since the two Sputniks, the mood in the nation and the mood in Congress has very substantially altered. After the two Soviet satellites were put into outer space, I had the opportunity to take a three-week lecture trip across the United States. I certainly talked with, as well as to, a large number of people and conferred with newspaper editors across the country, and I certainly reached the conclusion that the President could get the support from the American people for anything that he asked to meet this challenge, provided that he did not ask too little.

Last year, as you know, the Secretary of the Treasury and others led a considerable crusade to cut the federal budget. I noticed that the Secretary of the Treasury, at his press conference last week, did not do that. I think there is little disposition in Congress to reduce the request for increased defense budget which the President had made. I am inclined to believe that the real question is not whether the President is asking too much but whether he may be asking too little. I would not assume to give a dogmatic opinion that the President is putting the defense budget at too low a level. It isn't so easy to be so certain of your opinion as that. I would like to point out, as the President stated in his message to Congress, his State of the Union address the other day, that in five critical fields of defense—that is, in missiles, in nuclear ships, in atomic energy, in research and development, and in science and education—the new budget proposes to spend $4 billion more than in 1957. That is not a net increase in the budget but a $4 billion increase in those critical aspects of defense. Actually some aspects of the defense budget are being cut back and some civilian programs, at least as far as the President is concerned, have been reduced, so that the budget as a whole is only about $1¼ billion above the budget of 1957.

I am inclined to feel that in many ways it is not a worrisome question as to whether the President is asking too little. The President is taking a calculated military risk because he is putting large new emphasis on weapons of the future and, to the dismay of General Gavin and others, is cutting back further the strength of our conventional forces. The President must be calculating that the danger of limited aggression is not great, or that we possess the conventional capacity to deal with limited aggression. That is the premise on which the President can himself justify his increase in expenditures for missiles and related weapons, and justify the decrease in expenditures of conventional forces. But actually Congress, if anything, is going to increase the President's request for military spending so that the real worry isn't whether we are going to spend too little; because it is easy for Congress to appropriate funds for military purposes and you find Congress extremely reluctant to appropriate needed funds, from the President's standpoint, for problems of waging the peace.

Therefore, I think you can argue that Mr. Eisenhower is not putting defense spending high enough. But what will worry many people, and what indeed worries me, is that the Congress is already showing itself in the mood to give peace-spending the back of its wrist. There is a good deal of ominous evidence that the Administration's measures to counter the dangerous economic and political offenses of the Soviet will fare very badly in Congress. Money for missiles, anti-missiles and anti-missile-missiles will be shunted through with ease, but the signs are gathering that Congress can hardly wait to put the meat cleaver to the President's request for an adequate economic aid program, for a five-year extension of the Reciprocal Trade Agreements Act, to give incentive to expanding trade, and to an information program to begin to match what we are up against.

This means that only half of the President's program will fare well at the hands of Congress, as things now look. The President said that in his judgment it would be reckless folly to concentrate exclusively, or predominantly, or overwhelmingly in the area of military strength and put into the hands of the Administration the tools for waging the peace and for meeting the massive efforts which Moscow is making to penetrate economically the soft areas of the free world. We all noticed the other day that the Congressmen applauded when Mr. Eisenhower said, "We can make no more tragic mistake than to concentrate on military strength." But I happen to believe that the votes are not in sight to match this applause.

The Democrats are calling the President a piker for not spending more money for military purposes but they are not saying one word about meeting Moscow's massive economic offensive. It took the Administration two or three weeks to find even one lone Republican member of the House Ways and Means Committee who was willing to sponsor the Administration's bill to renew the Reciprocal Trade Act. After slaughtering its budget last year, will Congress put the United States Information Program back into business effectively? I think it is doubtful, as things now stand.

What isn't doubtful is that the President faces a hard uphill fight to get Congress to nourish the sinews of his peace program.

I thought it might be expected of me to tell you who the Republican and Democratic nominees are going to be in 1960. I have tried in different ways to sneak out of these questions. I have suggested an easy formula by saying that the Republican nominee will be a Californian and the Democratic nominee will be a non-Californian. Therefore, I will answer the first question by saying that when I say the nominee will be a Californian, I am not referring to Senator Knowland. As to the Democratic nominee, I have tentatively reached the conclusion that the Democrats are going to find it impossible to nominate anybody. They have so many candidates available for the ticket at the present time, that if all the candidates voted, they would be able to elect him automatically. Let's run through the list in 30 seconds—to show you how hard it is to pick a candidate. There is Governor Averill Harriman of the neighboring State of New York. All I can say is that he would be older than President Eisenhower if he were a candidate and I suspect that that will be a pretty serious disadvantage.

There is Senator Hubert Humphrey of Minnesota. He has grown a lot in the Senate in the last few years but I doubt if he has national standing. There is Senate Majority Leader Lyndon Johnson. A very cohesive case could be made for his nomination and I have to be dogmatic if I am going to be brief, and I will be just dogmatic enough to say that I doubt if the Democratic Party will nominate a Southerner in 1960.

Senator Estes Kefauver—I don't know whether or not he is a Southerner; the Southerners do not count him as a Southerner. He has been to the well twice and failed and I

doubt if he is going to be a successful candidate next time.

The leading Gallup Poll candidate is Senator Jack Kennedy of Massachusetts, an extremely attractive and personable young man. Again, it is my judgment for what it is worth that Mr. Kennedy lacks maturity and experience and I suspect that with those two handicaps, the Democratic Party is not likely to nominate a Catholic who also lacks maturity and experience, and that those three factors would make it extremely difficult for Mr. Kennedy.

There is Governor Meyner of New Jersey. Since we are in New Jersey I will pass on. Or should I? Governor Meyner has shown an ability to get re-elected as Governor of this State with a very substantial majority. I would have to say that I think that his views on national affairs are not known by anybody if they are known by Mr. Meyner. I would think that he would have an extremely difficult time in acquiring a national reputation equal to a nomination in the next two years.

There is Adlai Stevenson. And then there is Governor "Soapy" Williams of the State of Michigan. The prevailing view of newspapermen is that Mr. Williams will not get the nomination unless we are in a serious depression and it is the judgment of the President's Council of Economic Advisers that we are not going to be in a serious depression.

Then there is Senator Stuart Symington of Missouri. I am not going to predict—I think it would be foolish and you couldn't take me seriously if I predicted a nomination on the Democratic Party at this time. However, I think I would say that from the standpoint of the most logical political equation as it exists today, the most logical candidate for the Democratic nomination is Senator Stuart Symington of Missouri. I give you two reasons why he is the logical candidate:

He is the logical candidate because his field of experience is in the military field, he was the Secretary of the Air Force for two or three years, he is a businessman himself, and the Democrats anticipate that the broad issue of national security and defense will be a prime issue in the 1960 campaign.

Secondly, I am rather confident that despite the extreme statements that are made at the present time over the matter of the Supreme Court decision on segregation, the Democratic Party is not willingly going to tear itself apart on the eve of a Presidential nomination and that, therefore, a border-state Democrat would be the least unacceptable to the Southern wing of the party. So I give you Stuart Symington as the most logical nomination and add only the caveat that, of course, politics are never logical.

Now, how are these elections going to come out? Well, the Democrats are in a very happy mood in Washington. You hardly see a flicker of gloom whenever the Democrats start thinking about the Congressional elections this fall and indeed when they think about a Presidential campaign two years hence with "that man Eisenhower" out of the way. Occasionally you do run into a Democrat of national stature who, not too steeped in the atmosphere of Washington, has a few doubts and expresses an occasional warning, but that is a minority voice. I think it is overwhelmingly evident that most Democrats, which means about 99 per

ROSCOE DRUMMOND

cent, feel that they are sitting on top of the world and that everything is coming their way.

These are the reasons. I think it is useful to bear in mind that the upsurge of Republican strength in the United States did not begin with President Eisenhower as we tend to think, because he represented a tremendous Republican victory for the Presidency, but that the upsurge of Republican and conservative political opinion in this country began as far back as 1938 when President Roosevelt, following the ill-fated Court Packing Plan, lost 70 seats in the House of Representatives in the Congressional elections in 1938; and if it hadn't been for the war, I would suspect that President Roosevelt might not have run for a third term or might not have been elected. Actually, Republican sentiment was on the increase almost steadily from 1938 and reached its peak, I am inclined to think, in 1946, when the Republican Party, unexpectedly perhaps, won both the House and the Senate from Mr. Truman.

The fact is that of the past 14 Congressional elections—that is from 1930 through 1956—the Democratic Party has won all but two of those Congressional elections and in a sense you could say has won all but one since the close division of Congress in 1952 was a moral Democratic victory. The Democrats have continued to win Congress when President Eisenhower was not a candidate, as in 1954 and as in 1956 when Mr. Eisenhower was elected by nearly twice as large a majority as the first time.

During the past six years the Democrats have won more governorships, more state legislatures, more mayoralities, more courthouses than the Republicans, and the elections here in New Jersey and in New York and elsewhere last fall showed more of the same. A recent Gallup Poll, for example, indicates that political sentiment in the Midwest, once the stronghold of the Republican Party, is today as pro-Democratic as it was in the lush days of the New Deal.

Here is another very difficult coincidence for the Republicans. Many more doubtful Republican Senate seats will be at stake this fall than doubtful Democratic seats. Only one of the 12 Democratic seats at stake is viewed by the Democrats as seriously in danger, and 12 of the 20 Republican seats at stake are doubtful. No wonder that four Republican Senators have announced that they will not seek reelection this fall and not all of them, like Senator Knowland, because they believe that politically they can do better running for something else. They are just not going to run for anything.

If you are a Democrat you would be carefree and confident and cocky at this situation, and if you are a Republican, I think you would begin to wonder what you can do about it. Perhaps you would pay attention to the occasional soul-searching Democrat who thinks that the future is not completely rosy and begin to figure how the Republicans can make it less rosy. The Democratic leader to whom I was referring a moment ago is a respected voice who thinks that his party is getting itself in the position in which it will become known through its own doing as the war party. He feels that it will get saddled with this label if the following things happen as they are tending to happen at the present time—namely, if the Democratic Party continues to make American control of outer-space, as Lyndon Johnson called for the other day, a party objective, when in point of fact, as the President and Mr. Dulles have pointed out, outer-space ought to be controlled by all nations for all nations.

And if the Democrats keep calling for more and more missiles and concentrate on military strength without equal emphasis upon supporting the needed measures to wage the peace,

and finally, if the Democratic Party adds to its last year's votes against economic aid, against reciprocal trade and against the information program.

I think we would know realistically that if the Democrats pursue these ends in the present Congress and take the kind of posture which would justify the label of "war party," the Republicans can take advantage of it only on one condition—the condition being that they earnestly and overwhelmingly vote to give the President his measures to wage the peace. I am convinced that this is the one thing the Republicans can do to give themselves a real and perhaps an only chance of winning this fall.

A passing remark about the economic message which is going to Congress this noon. I happen to believe that no document shows more clearly what distinguishes Eisenhower Republicanism from earlier Republicanism than the President's economic Report to Congress this noon. When you read what the President says today about the present business decline and what can and should be done about it, the central difference between Eisenhower Republicanism and that of his conservative critics stands out very sharply and it seems to me the difference is this:

One, the Eisenhower Administration is determined to use promptly and energetically the full resources of the federal government to prevent any serious business recession or any large-scale unemployment. A depression, a business recession, is not looked upon by this Administration as an act of God, it is looked upon as an act of man. The President does not propose to stand around and wait for a recession to run its course.

Secondly, the social welfare measures which were enacted in the 1930's and criticized by many conservatives at the time as socialism, as welfare state-ism and worse, are today viewed by the conservatives of the Eisenhower Government not as burdens upon private enterprise but as desirable elements of our economy, which strengthen it and make it more immune to sharp fluctuation. The President's Economic Report describes social security, unemployment compensation, the broadened coverage of old-age and survivors and disability insurance as valuable and as "stabilizers" which cushion the impact of an economic decline and help to rectify it. In other words, these welfare measures are seen not as a drain upon our competitive economy, but as sources of stability and resilience.

You recall that at the President's press conference yesterday he said that while increased military spending is justified for military reasons alone, he welcomed the increased federal outlays at this time in order to help stimulate the resumption of economic growth in this country. And he said that at this time, if the upturn did not begin as soon as anticipated, he would not favor tax increases at the moment for the sole purpose of balancing the federal budget.

I know, as you do, that there are those who do not view the Eisenhower Administration as adequately conservative. This, in my judgment, does not mean that Eisenhower Republicanism is at all the same as the New Deal, and I think that people who equate the Roosevelt Administration in terms of the New Deal are grievously misreading the President's real position and are misreading the times. I would put it this way:

Whereas the New Deal leaned heavily toward minute federal regulation of business with an affection for price and wage control and government interference with collective bargaining, and whereas the New Deal had little faith in the dynamics of competitive enterprise, the Eisenhower policies spurn regulation, encourage competition and seek to safeguard the incentives to work, to save, and to invest.

What are the political realities in the United States at this time? I will express my own judgment to you for what it is worth. I must say I have a son who is always getting into hot water by being dogmatic about everything and anything that comes across his interest—getting into arguments in which he couldn't hold his own. One time I said, "Look, son, this isn't necessary. There is a way to get around this. I can tell you how to express the most dogmatic opinions and be absolutely infallible," and I am going to give you two or three infallible opinions now because my formula, which I gave to my son, was that all he needs to do is to begin every sentence with four simple words, "It seems to me." You can't be wrong because it does seem to you.

It seems to me that the political realities are these: If conservative opinion, particularly conservative business opinion, opposes the Eisenhower Administration as it did last year, it will deny itself any important voice in national policy for many years to come. And that will be bad for itself and bad for the country. That if business conservatives desert in any large degree, the Eisenhower Administration or a Nixon Administration, an administration conservative in money matters and humanitarian in human problems, they will be doing enlightened conservatism a grave disservice because they will be separating themselves from the center body of American politics.

I believe that the political alternative to Eisenhower conservatism or to Nixon conservatism is not a swing to more conservatism, not the election of a George Humphrey, but a swing to the radical left.

It would be my judgment that the Eisenhower Republicanism is the best ally that business will have as far as one can see ahead, and to suggest that if business is opposed to the Eisenhower policies (I don't mean that you shouldn't criticize, but let's not fight an ally of our best interest) it will invite another long period of political exile.

The concluding question I asked myself was, How is the Presidential election coming out in 1960, or who is going to win? I give it to you in one sentence: Both the Republicans and the Democrats are going to win because I incline to the perverse view that we are living through a political period, the end of which we cannot yet foresee, in which it is going to be impossible for the Republicans to elect a Congress and impossible for the Democrats to elect a President.

Inside The White House

By Bernard M. Shanley, Former Counsel and Secretary to the President

I welcome you all here to New Jersey. I join with all our people in hoping your deliberations will be as successful as I am sure they are going to be.

We are proud of our state. We are tremendously proud, I suppose, because those of us who have come from industry recognize that we are the fourth smallest state yet the seventh largest in productive capacity. And, of course, we are proud, too, of our many great industries in the state; many of them connected with your organization. Many of the canning companies have great industrial plants in this state.

I am here today not to talk about the Eisenhower program or the details of it, but I have been asked to tell you a little about the man I have been closely associated with for six years and my late place of business—how it functions, how it works, particularly, and how it works under this Administration. If I appear to be a little bit partisan, I hope you will forgive me, for in the past six years I suppose I have lived closer to the President than anyone except his own family.

In the 1952 campaign I was with him night and day, and there I built a highly treasured friendship with a man I believe to be the greatest President since Abraham Lincoln.

The presidency today is perhaps too much of a job for any one individual, because of the tremendous re-

sponsibility that goes with it, which in turn makes the job the most lonesome one in the world. The decisions can be made by only one person, not by any group, but by the President of the United States. I have told some budding candidates that if they had sat a week at my desk, I was sure that it would cure them of the bug of wanting to be President of the United States.

I enlisted in the Army in 1943 and during some lonesome hours I came to the conclusion that all of us have the tremendous responsibility of serving our country during wartime and an equal responsibility to serve it in time of peace. There is no better example of that in the world than President Eisenhower. Nobody in public life today has the knowledge to do the job as he has.

All of you are familiar with the 22nd Amendment. I think it ought to be repealed. I think that if the people of this country want a man for two or three terms, they should be able to make that decision.

I would like to answer the question about the President's health or vigor. I spent an hour with him last Saturday. Medically, I have no knowledge except what I get from Dr. Snyder, but I can't tell you how impressed I was with his vigor, with his bounce and with his keenness. I personally have no worries or concerns about the next three years, about his ability to carry on and his ability to fight through the military budget program about which he feels very strongly, which is taking two-thirds of our budget, 64 percent.

I personally have a very deep conviction that the next 10 years in this country are the 10 great years of decision, they are the 10 most important years this country will ever face and in my opinion has ever faced.

Again I say, there is no better example in this country than the President and his willingness to serve in peace as well as in war. During the 1952 campaign, he told me at least three times that he had no intention of running again in 1956 and he didn't. The President never wanted to run for public office, he never wanted to enter political life, but he has a dedication to the people of this country that made him feel in 1956 obligated to run again.

When we first went to Washington in 1953, the President called together his key staff people in the Cabinet Room and said he wanted to give them three admonitions. First, he said, he wanted us always to go around with a smile on your face. If you don't do it, people begin to wonder whether we are lacking confidence in our program, in the government, and what is taking place throughout the world. The second was always to take your work seriously but never yourself, and that has been a cardinal rule of the White House staff—and, I may say, of the President himself. The third admonition he gave us was, don't forget to pray. I have never forgotten these three things because they show the humanness, the humbleness, and the deep spirituality which you very seldom see in great men.

After World War II America emerged, of course, more mature, more prepared to assume its world leadership, which came to us, as all of you know, unwanted and unsought. But it came to us primarily because of the tremendous industrial capacity of the United States. With this came our World War II associations, world trade had something to do with it, and the fact that the people of this country feel very deeply that they want to help in lifting the tyrant's heel from the necks of the people back of the iron and the bamboo curtains.

As for the President's qualifications for this job: The military end of it, of course, you know and I don't have to tell you. In the foreign field nobody in the world today has anything like his broad knowledge of the problems. But what impressed me tremendously during the 1952 campaign as we traveled 50,000 miles through the country was his complete knowledge of every state we went into, its industry, its terrain, its great dams, its resources.

One of the things we overlook is that the presidency composes three major jobs—the Chief Executive, the Chief of State, and the leader of his party. In England there are three separate individuals for these jobs. And each one of these in the United States today, I might add, is more than enough for one person. Our two-party system is as much a part of our government as the Constitution itself. The President, at the same time, is the leader of 170 million people, and it takes a man of tremendous integrity to be able to take off one hat and put on the other.

One of the great problems is that the President can't delegate. He has these responsibilities under the Constitution which I can assure you President Eisenhower would not delegate in any event. People want to see the President when they come from other countries; they don't want to see anybody else. So the President's day is a pretty hectic one. Just before I resigned on November 6, we were running through a day which was pretty rugged. He was going from his office back to the Cabinet Room, and turned to me with a smile on his face and said, "Bernie, you know, I feel like the drunk who was jumping from jag to jag."

When I took over the position of counsel in 1953, the first thing we did was to take a look, and I had the Budget Bureau make a very thorough study of the presidency. No efficiency study had ever been made of the presidency. The companies with which you are associated periodically take a look at their situations in order to improve the efficiency of the executive branch or the administration part of their set-up. This had never been done of the presidency. When the President was taken ill with his heart attack in 1955, I resigned and made a study which took about two months. I testified twice before the Rockefeller Committee. One of the things I found in making this study was that the only custom that had ever been done away with in the history of the presidency was a custom established by George Washington. During the days of Hoover, the Secret Service insisted it be done away with; this was the custom where anybody who wanted to shake hands with the President could walk into the White House once a month and shake hands with the Chief Executive. Other than that, the customs that had been built up over the years had never been modified. They had become impossible and tremendously burdensome to the President.

After we finished the study with the Budget Bureau we had the opportunity to cut a tremendous amount of the trivia which came to his desk. Just as a quick illustration, for instance, the President had to approve the establishment of a fish hatchery in a national park. He had to approve the wearing of the Coast Guard insignia by Coast Guard officers. It took three Presidential signatures to send a second secretary to Korea to the Embassy. These are the kind of things that the President of the United States had been handling up until 1953. By executive orders, by internal directives, for instance, the President had to assign general officers in the Army and Navy to stations throughout the world. Most of this was done away with. In making these studies, the President insisted, however, that under no circumstances were his constitutional responsibilities or duties to be touched.

Let me tell you a little about the White House staff itself. My original job was counsel to the President. I had charge of the formation of the legislative program in 1953, 1954, 1955. I had charge and had to approve every piece of paper that appeared on the President's desk for signature. When I became secretary in 1955, I felt that the main job of the secretary to the President is to protect him and his health. It is a major order. The second big job of the secretary is to see to it that the President gets the information that we believe is necessary for him to have. Incidentally, the President takes care of a good bit of this himself because after his long day is over, three or four times a week, he will call people into the White House to meet with him there and discuss major problems, international and domestic. So he sees to it that he gets the kind of information that he needs. Sometimes any

man is going to be misled by misinformation and those things are bound to happen. But I can assure you of one thing, if you had been Commander-in-Chief during World War II, one thing you had to learn was how to get the right kind of information because if you didn't know it, it meant disaster. I can assure you the President himself knows how to get it, and does get it.

The staff is a very small one—there are only about 13 key people. We have two secretariats, one for the staff and one for the cabinet. As you know, for 35 years the question had been studied as to whether there should be a secretariat for the Cabinet. I can assure you that the present set-up has improved the effectiveness of the Cabinet. This is what happens: A cabinet officer has something he wants to bring before the Cabinet. He must get up a paper on the subject, which is circulated among the Cabinet officers. If there is a minority opinion, it appears in the paper which is finally submitted to all Cabinet officers before the meeting. I can assure you, the President expects them to do their home work and they do it. When they appear at a Cabinet meeting they have read these papers and know them. The secretariat follows up and sees to it that these reports and approval of reports have been implemented and approved. Presidents' aides are specialists. It is a little different in that regard from previous Administrations.

The day in the White House starts pretty early. Many a day started at 7:30 and ended about the same time in the evening—if we didn't have something to do that night. The President is in his office by a quarter to 8 every morning. Generally his Mondays are taken up with meetings with Cabinet officers, staff officers, and others. On Tuesdays we meet at 8:30. It is a little difficult for members of Congress, it seems to me, to get out of bed that early but they have to be at the White House at 8.30.

The President meets with the Republican leaders at 8:30 every Tuesday morning. On Wednesday he regularly has his press conference and after it is over we have our own mess in the White House, and there we have replayed to us a tape of the press conference which, of course, keeps us up to date with exactly what the President has said on a particular subject. Incidentally, our mess is a Navy mess. It was the old Williamsburg crew but it gives us a chance every day to get together and find out exactly what everybody else is doing because it is a busy life. Being a Navy mess, they had wooden napkin rings, on the top of which was our names and at the bottom was written the White House Mess. I always pointed out to my Democratic friends that this was a carry-over from the last Administration.

On Thursday we have the Security Council which takes about 3½ hours and on Friday morning the Cabinet meeting. During the rest of the hours of the day, visitors from all over the world come. Our own Ambassadors come in to report to the President, new Ambassadors come to present their credentials, and the staff members have a chance because they are in there constantly to see the President on their particular meetings. On many occasions when I have been on television, I have taken a list of a particular day, and shown what the announced meetings were, shown what actually happened, because it runs from six to seven times as much as appears on the open schedule of what

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the President actually does. Many days there are up to 25 or 26 separate meetings. The President usually quits about 6 o'clock at night, goes back over to the White House and personally invites people in to see him to discuss things that he wants to know about.

At night he has dinners, receptions, private dinners with key people to talk over general policies, and in his spare time he keeps pretty busy writing speeches. It always impressed me tremendously that the President never seems discouraged, he never seems downhearted, no matter how unfair he seems to be treated or how much he is criticized. Again I point out it is the most lonesome job in the world. In his own hand he has the tremendous responsibility of the survival of the free world.

One of the great things about the President, and I think one of the things about the staff around him, because it hasn't changed except for one death and my resignation since 1953, is the tremendous sense of humor that the President has. I think sometimes it is the thing that gets us all through from day to day. I remember one day we were discussing the Bricker amendment. After 3½ hours of this, things got a little bit confused. I might say, I told the President after this one conference, I was sure of one thing and that was he didn't need a lawyer. But this thing was getting pretty tense, and he started laughing and he said, you know, this reminds me of my brother Milton's story about chaos. He said, a cross-eyed judge went out on the bench one day and he looked out and, by golly, the whole jury was also cross-eyed. He said he looked at the first juror and he said, "What's your name?" The second one said, "John Smith." The judge said, I didn't talk to you, and the third one said, "I didn't say anything."

Another wonderful story comes to mind. During the push into Germany, the British sector, the President, then General Eisenhower, went to make an inspection. He was being driven by the British Commander-in-Chief in a jeep down a French road and all of a sudden a Messerschmidt came over and started to strafe them. The General slammed on the brake and they both jumped into the ditch on either side. After the Messerschmidt went over, the British General, with tremendous concern on his face, walked over to the other side and saw with great relief that General Eisenhower was hale and hearty. The President said to him, "I am very touched by your tremendous concern." The General said, "What I am really concerned about is, that I don't want you to get hurt in my sector."

It is his tremendous sense of humor that has carried the President through these terrific years. I can assure you of one thing, above all: President Eisenhower has no interest in glory or prestige. The only interest he has is the United States of America, its people, what happens to the free world.

The tenure of our generation, of course, is pretty short, both in time and in accomplishment, which leads me to the wonderful words of George Washington, "Let us raise the standard to which the wise and the honest can repair. The event is in the hands of God."

It is this leadership which means the standard of leadership of the free world. How this country acquits itself in the next 10 years is going to mean its survival. We are facing a period this country has never faced before, with the development of missiles, with the development of space, which has proceeded a lot further than anybody here realizes. But the fact of the matter is, that we, the common ordinary citizen, could do a tremendous amount of good in making certain that we have acquitted ourselves of our responsibility and that is to serve our country in peacetime as well as in war.

MARKETING SESSION

PRESIDING: A. EDWARD BROWN, 1957 President of N.C.A.

ADDRESS: "Recent Developments and Opportunities for Increased Profits in the Canning Industry"—A. C. NIELSEN, JR., President, A. C. Nielsen Co., Chicago

ADDRESS: "Selling More Canned Food through Food Brokers during the Distribution Revolution"—JAMES A. WEAVER, President, James A. Weaver Co., Lancaster, Pa.

AWARD to PAUL J. CUPP, President, American Stores Company, in recognition of his contribution to the Philadelphia Project

ADDRESS: "The Introduction and Promotion of a New Product"—Commander EDWARD WHITEHEAD, President, Schweppes (U.S.A.) Ltd., New York City

ADDRESS: "Does It Pay to Educate the Editor?"—ESTHER FOLEY, Home Service Director, Macfadden Publications, Inc., New York City

INSTALLATION of 1958 N.C.A. Officers

Recent Developments and Opportunities for Increased Profits in the Canning Industry

By A. C. Nielsen, Jr.,
President, A. C. Nielsen Co.

My talk this morning will be concerned principally with present and future problems and opportunities in the canning industry. Before turning to those points, however, I'd like to review quickly your historical accomplishments which are so well highlighted in the booklet entitled, *The Canning Industry* published by your Association.

Certainly, no one could read that booklet and not be tremendously impressed by the major scientific and technological advances you have made in the past two decades. Quality of raw products, production processes, canning techniques and containers have been improved to the point where consumers are able to take from retail shelves food delicacies unparalleled in our history and still unknown in many parts of the world.

These advances have played a great part in permitting the dramatic pack expansion you have achieved in the past 20 years. Production of canned foods has more than doubled in this interval, with all major product categories except canned milk sharing in the growth.

Favorable Economic Trends

Population expansion has, of course, contributed to this growth. Our domestic market has increased by nearly 40 million persons in the past 20 years. In 1939 there were only 131.7 million mouths to feed; today there are 171 million. On the average, then, there have been nearly 2 million new buyers come into being each year.

Of equal importance has been the fact that employment has gained proportionately, so that more people could afford, and demand, foods of greater variety and better quality.

The latter point is confirmed by the trend of domestic personal income. In 1939, personal income in this country totaled only $73 billion. In 1957, income will approximate $342 billion. Furthermore, during this interval, a substantial reapportionment of income has resulted in more people being able to afford more things than ever before.

While these economic trends have produced a favorable climate in which to work, to you gentlemen must go the credit for having found the products, the containers, and the merchandising techniques which were necessary to create the abundance of fine foods which would satisfy the discriminating taste of today's housewives.

Changes in Food Marketing

Having come this far this fast, it might be contended you can now relax. On the contrary, there are indications that you will have to work harder than ever to maintain the strong position you have built. That problems are occurring for some, at least, is suggested by the following facts:

(1) The number of cannery operations is declining;

(2) Some recent profit and loss statements have been relatively unsatisfactory; and

(3) Many new competitive factors are appearing on the horizon—some of which are proving extremely difficult to cope with.

I am a statistician and not a canner, and you may wonder at my presumptuousness in commenting on your problems. I am encouraged to do so for two reasons. First, our entire corporate life of 34 years has been devoted to problem solving in marketing. Secondly, we have been continuously employed since the early 1940's by a number of canners, specifically to study conditions in the canned food business. I hope that this experience may permit us to clarify current developments and bring them into sharper focus for you this morning. For all of you, these developments pose problems — for some of you they represent opportunities, depending upon the actions your respective managements may take.

Some of these developments make your products more vulnerable to competitive inroads than ever before. This is due to an increasing open-mindedness or receptivity to change on the part of both the trade and the consumer, coupled with the availability of powerful mass media which can alert a large percentage of our population to new and better products within a few weeks. Because of these and other developments, we believe that in the years ahead marketing executives will be faced, more often than in the past, with a set of circumstances like these:

(1) All competitors will be selling excellent products and your demonstrable advantages will be short-lived due to the speed with which your competitors will find it necessary to imitate, and

(2) You will have fewer and fewer pricing advantages due to increasing standardization of wages, raw materials, freight, etc.

For these reasons, you will be called upon to make decisions more quickly and surely if profits are to be protected. The need for the most accurate, possible marketing information as a guide to management will be increasingly important.

So much for the future. What of the present? The situation might best be described by saying business is good, but competition is tough. Let's look at the record.

Since 1950, consumers' disposable income—that is, income after taxes, or ability to buy, if you prefer—has increased steadily. In 1957, it was at an all-time high level, 6 percent above that shown for last year, and 49 percent above 1950. Over this same interval of time, expenditures in grocery stores have grown to almost the same extent year by year. This merely means that consumers have elected to spend each year the same *proportion* of their earnings for grocery products.

This continued expansion in grocery sales is difficult to explain—stomachs being only so big. However, four factors must be kept in mind:

(1) Population is increasing.

(2) Nutrition probably improves as incomes increase.

(3) Some trading-up to more nearly finished products occurs as ability to buy improves, and

(4) Prices have increased.

The latter point is illustrated in a comparison of dollar and tonnage sales trends for all grocery stores in the country from 1950 to date. The tonnage increase of 36 percent in the past seven years lags the 55 percent dollar gain seen earlier. In either case, however, business in total has been good and is getting better. The volume of units sold has been increasing in recent years by 5 to 8 percent per year.

On this basis, it would seem that one could have expected an automatic sales increase in each of the years immediately preceding, almost irrespective of the product offered. Such has not, however, been the case with established products because of the competitive factor mentioned earlier. The uptrend or sales gain for all grocery items combined is substantially above that for what we normally think of as regular grocery store items—reflecting, of course, the introduction of new lines of merchandise.

From a usage standpoint, some of these new products qualify as direct substitutes for the products you sell; others satisfy new uses. In either event, you are directly affected, since they take shelf and display space from established products, and divert retailer and consumer dollars and attention.

Let me give you but two examples of this new form of indirect competition now facing the food canner. At the end of World War II, few grocery stores were actually selling many packaged drug store items. I refer to tooth pastes, shaving creams, shampoos, and things of that type.

By 1952, a sizable volume on the ten largest of those commodity classes had been established in the food trade. Still nearly two-thirds of the total national drug-food volume was being done in drug stores.

By 1956, in four short years, food store sales of these items had gained to such an extent that they accounted for 51 percent of the total and were thus greater than those reported in all drug stores in the country. Add to the foregoing the kitchenware, household supplies, electrical supplies, stationery and greeting cards, sporting goods, etc., now handled by many large stores, and you will agree, I'm sure that diversion of time, space and money to new items is a reality.

New food items are equally diversionary, and even more competitive from a usage standpoint. Some of these items are showing surprising growth rates; and in some cases such as prepared frozen dinners, for example, a purchase probably precludes normal buying of vegetables and other items which would otherwise accompany a home-prepared main dish.

With these items, as with many others, a demand for convenience seems predominant—convenience in shopping as well as in meal preparation, sometimes regardless of what we used to consider important cost differentials. Heaven forbid, I even imply housewives are lazy; rather, I think for many today there is a real need to save time.

Consider for example the amazing growth in the number of employed women, many of whom are homemakers, or others who must prepare their own meals after work. More than 21 million women are employed today—nearly one out of every three workers nationally. Add to this the fact that domestic servants are scarcer than the proverbial hen's teeth and that the number of families with an income sufficient to permit a considerable degree of independence with regard to purchases has increased, and you have a made-to-order climate conducive to the introduction of new products or new ideas which permit the saving of time.

The use of such products, a gradual reduction in the work week, and other factors have given most people more leisure time. A part of this leisure time is being used to watch television and listen to the radio. An analysis of our Audimeter records of radio and TV usage reveals that the average home in the United States is now using radio and TV 7.2 hours per day. This usage rate is 2 hours per days over the 1950 average and is climbing steadily. As a consequence of the increased use of these media, they offer attractive possibilities to the grocery advertiser. Furthermore, since it would seem somewhat difficult to do all this listening and looking and still have time for the many other household chores, it would appear that this one influence, at least, will continue to exert pressure for time-saving in food preparation and other domestic functions.

The changes just referred to are important for they mean that extra dollars must be provided by business men for product and package research to keep abreast of these new living habits. Other startling changes are occurring also which make it desirable to review and modify existing sales and distribution policies. Of major concern to you is the continuing trend toward concentration of grocery business in the hands of fewer and therefore more powerful retailers. In 1948 there were 408,000 grocery, grocery-meat, delicatessen and country-general stores in the United States. These stores did slightly over $26 billion of business in that year.

At the end of 1956, only 361,000 stores did $41 billion of volume. Thus, some 37,000 fewer stores did $15 billion more business. More importantly, however, the chains and independent supers which formerly accounted for only 43.7 percent of the total volume have grown to over 61.0 percent of total in 1956.

Large stores have forged ahead at a surprising rate and are now individually big businesses. In 1956 the average chain store did $908,000 total sales; the average super independent did nearly three quarters of a million —this as compared with only minor progress in volume for all remaining stores.

Let me put it another way. To be exposed to 70 percent of the grocery traffic in the country, the average grocery commodity needed distribution (shelf placement) in 112,000 stores in 1939. Slightly more than 90,000 stores would do the trick in 1948; 55,000 stores were required in 1954. Somewhere between 45,000 and 50,000 stores are needed now, and the figure is declining each day. More importantly, the number of buyers is declining at an even faster rate because of acquisitions or chain consolidation. This puts a tremendous premium on each sales call. A successful contact is highly productive; a failure can hurt like the dickens.

Remember I have been talking about the average grocery commodity. On most canned foods lines the concentration of business is even greater, since the products you men sell are typically merchandisable big store items. For example during the 1956-57 pack year on canned peaches, pears, corn and peas, fruit cocktail, catsup and tomato sauce, 24 percent of the stores in the country did approximately 85 percent of the volume.

Perhaps I can emphasize the importance of a few stores even more by pointing out that only 27 corporate chain food operations do nearly 50 percent of all national

volume on a sizable list of canned foods lines. It is evident, then, that this merchandising revolution is of more concern to you people than to the average food product seller.

Further, your continuous need to have the right pricing, delivery, and merchandising schedules increases in direct proportion to business concentration. In addition to keeping these factors constantly in tune with the new tempo of business, consider also the quality of your sales representatives. The caliber of men now buying for the large retailers is first class. Because of this, every grocery manufacturer should consider ways of upgrading his own representatives who must deal with them.

In dealing with intelligent well-informed buyers, it is well to remember that the larger the store, the greater the selling efficiency demanded of any product. The point is well illustrated by a study of gross sales per square foot of selling area by store sizes. As volume increases from $4 thousand to $10 thousand per week to over $30 thousand per week, weekly yield per square foot of selling area increases from $1.85 to $3.63. Certainly, a slow mover would have little chance of retaining shelf space long in the latter case, and the necessity for this yield to maintain profits makes buyers look long and hard at new or non-established items. Furthermore, factual data are wanted by the buyer from the seller covering the performance of established items as well. The days of the silver-tongued master salesmen are on the wane. Results are more likely to be achieved today by equipping your men with a sound presentation including such figures as turnover rates and profit per dollar invested in inventory.

So much for a quick look at the food merchandising picture as it exists today. You men could add other points to the few major developments I have just cited. I'm sure you will agree, though, they would only emphasize the general theme expressed—that intense competition is the order of the day. The $64 question is: What of the future? My crystal ball is murky and cloudy, but in the background are a few discernable signs which I would like to relay. Possibly we can interpret them together.

Point-of-Sale Support

First of all, I should think you might be optimistic concerning the demand for foods in the years immediately ahead. Our population growth in recent years has been truly surprising. It has traced to increased longevity and births per family but principally to the increased marriage rate in the 1940's. And the children of those marriages are now, or soon will be, marrying and having children of their own. Thus, we have a compounding chain-reaction effect which is just now beginning to be felt. The tremendous gain of 16 million which occurred in our national population from 1950 through 1956 will almost certainly be exceeded by the gain which is expected to occur in the next six years.

The Census Bureau estimates that by 1960 population will exceed 1956 levels by about 12 million persons, a total which exceeds the combined present population of the states of Maine, Vermont, New Hampshire, Connecticut, Massachusetts, Rhode Island, Delaware, and the District of Columbia. Someone will have to produce the food for these people; so the opportunity seems real. It is a question of recognizing and solving demand and distribution problems. In your planning, remember the growth will be centered in the "under 20" and "over 64" age groups which will, in all probability, require specialized products.

No doubt the trend to urbanization will also continue. This also points in the direction of increased demand for canned foods. In 1950, 16.6 percent of our total population lived on farms; today only 12 percent are so located.

Under the impetus of these developments, and barring some unforeseen circumstance, the pack expansion of earlier years should continue. But the business climate has changed, and many sellers will have to make substantial changes in established policies in order to share proportionately in whatever growth may occur.

Consider merchandising methods, for example. Here we must recognize that voluntary retail point-of-sale help in selling our products probably will continue to decline. In earlier days when store layouts were less modern, in-store inventories were heavier, fewer items were sold per store, and competition was less vigorous, retail displays and week-end special advertising were relatively easy to obtain.

Today, however, active help of this type on any individual item is much harder to secure. Despite substantial effort, the average showings for 8 canned fruit and canned vegetable items today are nearly 20 percent, or one fifth, less than in 1951. Since dozens of studies we have made over the years prove the great value of retail-point-of-sale support in moving merchandise, it seems apparent that you have no alternative but to work harder in developing successful programs of this type keyed to retailer requirements or lose out in the competitive race.

Appraisal of Inventory

Second, and closely allied, is the need for continuous appraisal of your retail inventory situation. Retail stores are faced with rising costs, as are canners and all other businessmen. In an attempt to counterbalance these inflationary pressures as well as to accommodate investment in new items, stores have sharply scaled back inventories of old-line, established products. As a result, shelf velocity, stockturn, and profit on invested capital have gone up, but inventory pressure has gone down.

This trend is general, but it has been particularly noticeable for canned fruits and vegetables. On-premise stocks of four leading volume canned fruit and vegetable commodity lines are about half what they were in 1948, and the downtrend is continuing. You will agree, I'm sure, that this situation is not conducive to increased volume. It needs some counterbalancing sales influence. You will recognize too that, as stocks decline in the stores, some items are more likely to run out of stock. As the out-of-stock problem becomes progressively worse, it cuts down the effectiveness of your advertising. Demand may be stimulated and then cut off at the point of purchase.

As a countermeasure, many of you have already increased and dispersed warehousing facilities. Such a step adds to costs, of course; but, if insistence continues on the part of buyers to delay orders until the last minute, there would seem to be no alternative but to provide for immediate delivery if you hope to make every possible sale.

Appraisal of Promotion

Third is the need for a realistic appraisal of recent promotional developments. At the risk of seeming critical, I would suggest that too many of you spend too much time thinking in production terms—quality and price. Both are highly important, but a third quality—stimulation of demand—gains in proportion as competition increases.

We often talk in such big figures—national population, total grocery sales, etc.—that we lose sight of the fact that our business success is determined by millions of little decisions, each of which is important to someone at the time. In 1957, the average per capita expenditure for all items sold in all food stores in the country was only $255. This narrows down to $21.25 a month, or about 70 cents a day—and it's important to each of you to try and get some of that 70 cents. Always remember, everything offered for sale competes with your products—not only items sold in grocery stores, but other goods and services as well. If other industries or other individuals are going to try to influence demand, you must promote the basic good qualities of canned foods in order to stay in the race. The easy way out, of course, is to have a promotional budget so large you can do everything anybody else does. Unfortunately, few are in that position. Fortunately,

excellent results can often be obtained by devoting more time to studying the problem and thereby sharpening whatever promotional tools are being used.

When it comes to advertising, two points stand out: more money is being spent, and each dollar is working harder due to better media, better media selection, and better copy. Media research has made substantial contributions to manufacturers' knowledge in this area during the past few years. Your own programs, to be competitive, must increase proportionately and be made more efficient. In 1957, for example, the level of major media outlay by 20 of the largest grocery-item sellers in the country was 7 percent above the 1956 showing and 40 percent above 1952. If your own programs lagged, and all the evidence I have been able to gather indicates this is true for the canning industry versus the aggregate, you may be overlooking an opportunity. For example, most of the companies (other than canners) with which we are familiar who are selling their products through grocery stores spent about 4 percent of their factory revenue for media advertising last year. Just as no manufacturer can long afford to be out-promoted by his competitors, neither can an industry permit itself to be out-promoted if it expects to share in the growth of America.

Consumer Education

Fourth, and in the same connection, is a need for examining direct consumer-promotion activity for possible future use. Historically, there has been little of this type of promotion in the canned foods field. But such activity is growing in the grocery industry and poses another problem or opportunity for you. Others generally have found that promotions of this type will achieve a consumer sales and share-of-market increase during the promotion, but the gains achieved are only temporary. They have found, too, that deals will seldom change the trend of a long-established brand or product. But, and this may be important to you for future use, it is widely recognized that special promotions may be of value in introducing new or improved products, in broadening distribution of old products, and in fighting a defensive battle against an aggressive competitor.

What I am suggesting is a review of promotional budgets to be sure that the proper proportion is going into the consumer promotion, as compared with that going into trade deals.

Product Attractiveness

This discussion of advertising and promotion leads up to my fifth point. There is a growing need for appraisal of product attractiveness from the consumer's standpoint.

In the past 8 to 10 years, self-service stores have grown at a tremendous rate. They now do 82 percent of the grocery business. The stores are giant and impersonal. No longer does the housewife ask a manager or clerk what is good for dinner or how to prepare such and such a product. No one except a stock boy or a check-out girl is in evidence. Your package speaks for you as it never did before. Be sure it stops the consumer's eye and presents, as quickly and effectively as possible, one or more reasons why it should be bought. Whereas 10 years ago a package change could be made with little effect on sales, in recent years our reports have been showing size-

A. C. NIELSEN, JR.

able shifts as a consequence of better packaging.

With 7 to 8 thousand products available in many of these stores, each hoping for customer attention, it would seem essential for you to have the best possible salesman on the shelf. If you don't, and lag in the race, it's a sure bet some other brand or commodity can be found to take your place. Fortunately, when changes of this type are contemplated, investments and risks can be greatly minimized through the use of controlled test-marketing programs.

Product Improvement

As a sixth point, I would suggest that you start at the earliest possible moment to explore the question of product improvement. I am treading on hallowed ground, I know, when I imply that what you are offering isn't the finest thing available, but others are trying to convince housewives that they have something better and there is always the possibility that housewives will agree, regardless of the nutritional or cost merits of the case.

Oftentimes slight changes in the color, taste, or texture of a product can increase its sales significantly. Your production people might not agree with such suggested changes, contending that they may add to costs or even reduce quality, and they might be right; but then they are biased consumers at best, and you must sell as consumers want to buy.

You might find that a very minor change would produce results as pleasing as one of our clients did recently. About four years ago, the seller of an established food product became convinced that a minor taste change would be beneficial. Since that time, his volume has gained 93 percent; his share of market has jumped from 15.2 percent to 23.0 percent of total. We have other examples in our files where a reduction in product quality —from the manufacturers' viewpoint —resulted in greater customer satisfaction and sales. I feel sure that some of you have learned in one way or another that women often act irrationally and unpredictably. Since most buyers of canned foods are women, a little experimentation along these lines can be productive.

For example, a dramatic sales story is being recorded today as a result of a minor package change by another established food seller. His sales were slipping prior to the change, largely because of a competitor's development. More recently the declining sales curve has been reversed, and volume is running 17 percent above that realized just prior to the change.

The can companies certainly won't thank me for suggesting there is much that can be done to improve your package—a can. However, I have personally counted and restacked thousands of cans and have heard dozens of grocers complain about the difficulty of stacking canned foods. Complaints about the opening of cans leave little doubt in my mind that someone will someday find something better.

New Products

Suggestion seven follows logically. It is to spend a major amount of time and money, in the years immediately ahead, in the development of really new products. You will recall I said earlier that openmindedness and receptivity to change on the part of consumers are the order of the day. This situation is nowhere more aptly illustrated than in the record of newly introduced grocery items—items with some element of convenience which did not previously exist. I am referring to such things as prepared cake mixes, concentrated frozen juices, new blends of juices, etc.

To give you some idea of the opportunity in this direction, we have segregated from our records the long-term sales trend of total grocery

lines, all of which contain both established and new convenience items. The aggregate sales gain for all fields over the past four years has been 33 percent on a tonnage basis; over the same interval, established items, selling in the same old form, are up 10 percent; strictly competitive, new convenience items in total are up 124 percent. The latter fall into two categories: those which, excluding housewife labor, were equal to or lower in cost than the old established item; and those which cost somewhat more. Sales of the former were up 144 percent, the latter up 98 percent. These figures suggest that the housewife of today is not as price conscious as one might think. These figures would seem to deserve careful reflection by those inclined to plan for the future rather than accept what comes.

Study of Pricing Policies

Finally, and as my eighth point, I would suggest that you study your pricing policies even more critically than you have in the past. Based on available current knowledge, it would appear that raw products, cans, sugar, cases and labor in the aggregate are going to exert upward pressures on your costs. At the same time buyers, who individually are getting larger, will be doing the job they get paid for—namely, exerting all possible downward pressure on your delivered prices. As a result, a continued squeeze on your margins seems inevitable.

Short-term, you can meet the situation in lots of ways: by not pricing to reflect the replacement cost of your facilities, for example; by scaling back selling and merchandising effort; by failure to invest in new product development or in studies aimed at learning more about how to sell, and forcefully present your products to retailers and consumers. When orders are slow and obligations heavy, there is a tremendous temptation to take one of these ways out.

However, all signs point to the increasing need for efficient, modern plants, attractive new products, packages and labels, vigorous promotional support, and more up-to-date factual data—if an individual canner or the industry in total is going to hold to or expand established position in the market place.

Under such circumstances of keen competition, many manufacturers fear to price so as to recover their costs. I say to you, forget these fears. The figures we have seen today prove that the need and want for your products is great and will grow. You can sell plenty. But you must know in each year just how much you can sell profitably. To earn satisfactory profits consistently, production must be geared more closely than in the past to consumer demand.

Because there are so many canners and growers, and further because of the inevitable variations in growing conditions, balancing supply and demand is most difficult to accomplish. New and better forms of group action will be essential if supply and demand are to be brought into closer agreement, as it is evident that for most crops the supply capabilities have for the present outdistanced demand. Your own fine Association, in our opinion, is doing an outstanding job of gathering and disseminating vital statistics. Perhaps a broadening of this and other types of activity in these highly competitive times would be a wise investment.

Common action in some form seems particularly desirable now to promote the sale of each commodity in order that demand may be kept in closer balance with supply potentials. Remember that every food product must compete with every other; for this reason, consumers must continuously be made to want your products over others.

So far as each canner goes, he must first make his costs competitive. The knowledge, skill, tools, and record of past accomplishment suggest that you men will continue to offer real values to the consumers.

Next, the canner must encourage his sales representatives to sell not first with price. Equip them with modern products and an efficient delivery organization so they can sell first with quality and service. Let the competitor worry about price.

I predict that as retailers become better informed through the use of high-speed accounting equipment and other forms of record keeping, they will be looking more for dependable delivery, consistent quality, and items of fast turnover from which they can earn a profit on limited shelf space.

In all of this, work the retail trade with increased diligence and adjust grievances promptly, for, as we have said, each call and each account are now more important to you than ever before.

Finally, don't be afraid to set prices which return you a fair but not exorbitant profit. Without adequate earnings you cannot long continue to provide the many fine products which Americans need today to stay strong and healthy—nor can you develop and produce new and improved products for a better tomorrow.

If these things are done, I feel confident that you will surely grow and flourish and that your employees, suppliers, and customers will prosper with you.

Marketing Canned Foods through Food Brokers during the Distribution Revolution

By James A. Weaver, President, James A. Weaver Company

I shall discuss with you this morning three areas of endeavor that can help us sell more canned food.

First, the consumer and the attitude of distributors and retailers toward canned foods.

Second, the tools you give us to assist in the accomplishment of our mission and joint effort.

Third, the man who grew up with the canning industry—the food broker.

Because of the rapid change, I believe that it is wise that we appraise the situation as it is as of the moment. In this rapidly changing economy nothing is permanent.

Attitudes toward Canned Foods

What is reality today is obsolete tomorrow. Busy shoppers are directing a retailing revolution that formerly would have taken decades to accomplish. Changes are coming so fast they are over and done with before we know it. Hand in hand with the concentration of retailing have come the mergers and concentrations of chains. Virtually we have become an industry mass-producing, bulk delivering to distributors and chain warehouses, who, in turn, service stores capable of bulk receivings. This is particularly true of those few stores which have corralled the lion's share of our grocery store sales. Only 7 percent or 27,000 in number, but they account for 62 percent of all the business.

Population concentration and suburban living have created an ideal atmosphere in which to develop shopping centers and supermarket locations with adequate parking facilities. A real boom to retailing and a relief for shoppers trying to fight their way through the overcrowded downtown areas with their inadequate parking facilities.

Busy homemakers are real energetic gals, ambitious for their families and interested in obtaining all the advantages possible for their growing young ones. In fact, today's homemaker is so busy that she just doesn't have the time, nor is she inclined, to spend all of the time in the kitchen that was necessary a few years ago. Fortunately for her, it is not necessary. Available are a whole host of "convenience foods" on which manufacturers have done the work for her. She pays for it, but she feels that the added convenience is worth the additional cost. At least to the moment she has so demonstrated. Possibly this luxury of the past few years will be the necessity of tomorrow.

My mother visited the grocery store for her groceries, the produce stand

for her green goods, the butcher shop for her meats, and dealt with the dairy for her butter and eggs. She depended upon these people for her needs and followed their suggestions. They took good care of her. Those who follow this pattern now are few in number. The saving in time has become so necessary that the modern shopper wants the weekly necessities all under one roof—not only the food she buys but other household items as well. Since the grocery store is the one store where she must shop each week, it is only logical that she should also buy toiletries, drug supplies, magazines, toys and, generally speaking, the things she normally replaces in the home each week. As the year progresses she will purchase shrubs, garden supplies, lawn seed, a watering can, beach equipment, etc. This scene repeats itself throughout the year depending upon the season.

Truly, the supermarket is an exciting trip for the entire family who almost always leave more money at the checkout counter than they had planned. Nonfood items are a must and those within reason are purchased from the food budget. In fact, the number of items available at the supermarket for her selection has grown from 847 in 1927 to 6,000 and over in 1957.

I would like to suggest to you who prepare canned foods and to those of us who sell your products that we have a two-fold purpose: first, we must achieve a greater awareness for canned foods with retailers, chains, distributors and consumers; and, second, we must secure the retail distribution to back it up.

The importance of this task grows each day because of the competition we have, first with the consumer and secondly within the store itself.

The pounds of food that we consume per capita vary very little, but the things we eat have changed drastically. There must be a constant quest to improve old products and to develop new ones—good wholesome food from cans that we bring to our customers only after careful market testing and evaluation. In our own office we have never found it difficult to get distribution on products of merit. We have experienced difficulty in marketing those products that merely duplicate without improvement. New products are the life-blood of the industry, require careful researching and market testing. In our first area of competition, with the exception of the pass-through foods such as canned juices, we are competing with all solid edible food with which to fill the stomach. This spot, once full, cannot agreeably take more. A wide variety is available from which to select, and I feel that we can better tell our story about canned foods, that we can glorify the tin can and build a legendary romance around this economical container. It has become so commonplace that it is taken for granted. Canned food is so traditionally a part of the grocery department that very few attach the importance to it that it so richly deserves.

Aids to Selling

Let's explore for a moment some of the things that would improve this position. Working as a team, with you calling the signals, we could develop some worthwhile tools from information that is readily available to show the advantages of canned foods. *Progressive Grocer* will have available for distribution in 1958 some outstanding facts from the Super Valu study that would give canned foods salesmen a terrific tool when presented properly. It is not enough to buy reprints for distribution to your brokers and their salesmen. The G.M.A. preview of this information would indicate that there is enough information available that it would take many brochures to tell the story fully. I believe this to be an industry affair and not so much an individual canner responsibility. I saw a pickle brochure prepared for the industry by the Armstrong Cork Company that was usable and outstanding. Their source material was the now-famous Food Town Study. The facts they used were the same, but they glorified it and made it useful and understandable. Our information should include the fact that canned foods are sold from low-cost equipment and suffer practically no spoilage. The store equipment is not readily obsoleted, and canned foods have practically unlimited keeping qualities. The end result is profit for the retail store which should exceed other departments, taking into consideration space required, cost of equipment, and ease of handling. This tool I would suggest to you for use by your brokers.

How frequently have we told the story of how canned foods have helped fight the inflation battle and through our canning efficiencies, with better growing controls and automation, have been able to place canned foods in the category of the retailer's "best value"? Compare the cost of canned foods to any of the things that people buy and I am sure that you will be amazed at the small increase in price during the past 10 years. This might be fictitious, but I would suggest that we ask any canner of corn or peas what kind of value his product has today. The story could be told easily in a forceful way and in the language that anyone could understand. Let's compare the retail price of canned foods with the retailer's payroll, his rent, his new car, or with any other category of food he sells, and we will all be forced to admit that we can truthfully boast that canned foods are the retailer's "best buy". Give this tool to your food broker representative and he will use it wisely to your advantage.

Canned foods are a natural pantry item because they are stored so easily at home. When our wives prepare meals most days of the week, they do so primarily from what is available. Most staples are purchased weekly so items that can be sold in multiple units become a good pantry item and will be used more quickly because it is there and available as the gal debates in her mind, "what shall I have for dinner tonight?" Here is a tremendous story for us to tell. A sales campaign could be built around this theme. Material could be made available to all elements of food distribution, with pantry stocking as the basic theme. Many of you could not afford this individually but collectively you can. In most ideas it is the execution that pays off, so how well your representative would use this tool becomes the keynote of its success. Material should be so designed that it could be used as a store selling theme for a group of stores or for an individual market. It would be usable material and basically sell canned foods and not brands. Some of the major companies have material with which they can decorate a store for one of the major campaigns. However, this suggestion is made in the hope that you will want to promote canned food products as such in our effort to capture a greater share of available dollars. We can do just that if we give the consumer a good reason to buy.

Most canned foods are available in a variety of sizes and consequently can be purchased to family numbers. They are also available in a quality grade to fit any budget. All of it is good, wholesome and nutritious food. So with the built-in convenience factor we have items that are readily designed to fill most any use. Canned foods respond readily to promotion. May I refer you to *Progressive Grocer's* Super Valu Study which has reported in detail the effects of displays on canned foods. This information is readily obtainable and should be put into workable shape for your food broker representative or your own direct sales force. We cannot have too many people telling the story of canned foods.

I briefly mentioned the factor of "convenience in use." Here is a powerful story which should be exploited in every sales message and in all your advertising. I will agree that everyone knows it, but we cannot take it for granted. We must continually tell it over and over again. We must remind the consumer constantly that we are preparing foods for her family that are labor free. The canner's chef working in a spotless kitchen brings you garden fresh foods easy to use.

Here are the facts we have discussed so far:

Number 1—Business is being concentrated into fewer and fewer hands at all levels—food processing, distribution and retailing.

Number 2—Consumers are buying and paying the extra cost for convenience foods because the homemaker feels that the extra time this affords her can be used to good advantage.

Number 3—We should start an industry program to tell the story of canned foods and their advantages.

Number 4—We must develop new products suitable to canning plants.

The Food Broker

To me food brokers perform an economically sound function. Just as buying habits have undergone changes, so has your food broker. Selling functions once performed by distributors and wholesalers have been discontinued because of the necessity of streamlining. For those of us who sell brands, a complete selling effort is required. Consequently, this necessary selling responsibility has reverted to your sales force or to your food broker representative. Just as we, as an industry, are fighting for product recognition, so are you with your own brand within the canned food group. Since the war, merchandising departments have been added to the list of services rendered by food brokers. Outstanding results have been attained and at less cost to the manufacturer than he could do it for himself.

New items have been made available to the food broker in a direct proportion to the number of items stocked by the supermarket. To offset rising costs, many food brokers who formerly specialized in canned foods have added other grocery products. New broker organizations are not even interested in the sale of canned foods except those specified as "specialties." Some of us try to maintain a balance. Some of us, following the war, took on manpower in excess of our marketing potentials and carried our retail activities much deeper than was consistent with good business. Some of us, feeling that we should further exploit our old lines to offset the pinch of rising costs, turned our backs on new lines. Much progress has been made in the past year or two in finding solutions to some of these problems.

Since I am being as honest with you as I can, I might as well face the issue. Just as food stores have more lines to sell, so do food brokers. Some, by design, have added additional lines to help share the cost of the organization required to carry on the selling functions necessary to do the job that you want done. To further complicate the situation, not all sales of canned foods reach the retail market through the food broker's office. A sizeable portion, with which we actually compete, has been siphoned off. I do not condemn this practice, but it is a loss of revenue that does not result in sales dollars that can be interpreted in terms of sales effort through your food broker representative. It is one of the reasons why some food brokers have been inclined to center their efforts more on the branded specialties.

There are three areas where we exert effort to influence consumer purchasing. First, there is the distributor and chain headquarters. They are a "must" and require the full cooperation of your representative. All selling themes should not only include our product message but also tell the story of canned foods. Give us something each month that we can tell our customers about this wonderful industry of which we are a part. Let's tell our story so well and so forcibly that our enthusiasm will pass right through to store management.

Second, there is the store level. Here we do run into some complications. Chain store managers are hired to run their stores. They are not buyers. Grocery managers are hired for specific duties and to carry out the wishes of management. There are, however, a number of useful fields where brokers or packers' merchandising men

JAMES A. WEAVER

can render service in any retail market. This is almost an individual problem and requires individual solution. It varies by areas and retailers. Of the 27,000 supermarkets, which control 62 percent of the business, the large majority welcomes this assistance. This past year, the American Institute of Food Distribution, working through its Food Brokers Merchandising Council, conducted three panel discussions at which all elements of manufacturing, distributing and retailing were present. At our last meeting, at the time of the Food Brokers National Sales Conference, we discussed "How Merchandising Men of Food Brokers and Packers are Cooperating to Increase Retail Sales." Some of the questions asked of the panel by packers were most interesting.

Packers asked:

Why do certain brokers and their salesmen resent working with manufacturers' personnel, either at headquarters or in retail stores?

What special work in supermarkets can merchandising men effectively do on Fridays?

How many service contacts in supermarkets should a manufacturer expect the merchandising men to handle, in one day, in the different kinds of distributing territories?

How are the field representatives of manufacturers successfully guiding the merchandising men toward supplying better services for principals and retailers?

How can a manufacturer cooperate with the merchandising men to organize store promotional work in the supermarkets of a chain?

What should merchandising men not do in the supermarkets of chains and independent retailers?

Brokers also asked interesting questions:

How can a broker secure enough compensation to cover higher costs for the expanded services wanted in supermarkets?

How has the routing of merchandising men been improved in the last year?

What special work in supermarkets is sharply reducing "out-of-stock"?

What method is being used to speed the trend of large national chains toward allowing merchandising men of brokers and manufacturers to do service work in their stores?

If a merchandising man has time to perform only one service in a supermarket, what is the most important thing for him to do on that call?

What plan should be used by a principal that will contribute toward his arranging for the selling services of a broker with a merchandising organization able to get results?

One of these panels was conducted in New York. Two were in Chicago. Everyone evidenced the desire to work more closely as a team in our effort to sell more good food to more people. It will take team play and the available services of manufacturers' and brokers' merchandising men to exploit the potentials fully. As competition for available dollars increases, we in the food business must work together if we are to maintain and enhance our take of the gross national product.

The third area, the consumer, belongs primarily to you. We can help sell your advertising program, we can establish distribution and fight to hold it, but the consumer educational program goes beyond our call of duty.

Summary

I shall take just a moment to summarize the three areas we have been discussing.

First: The consumer educational program will require an investment—an investment that will pay off in the terms of profit to an industry dedicated to preparing good, wholesome and appetizing foods; foods that are economically priced because of the high degree of efficiency in procurement, processing, distributing and re-

tailing; foods that are sized to family numbers and available without nutritional loss to fit any budget. No system, so far, for preserving food for later use equals the value offered in canned foods. We must strive to make everyone conscious of the tremendous job we as an industry are doing. We should not be taken for granted. Canned foods are not put up in the "can house" in tin cans. These are food preparation centers using the nation's most economical container—bright, sanitary and adaptable to mass product.

Second: We must equip our salesmen with better tools, tools with which to tell our story to distributors and retailers as part of the program to secure better retail showings for the industry. We must fight to earn the right. If we can do our consumer educational program right, then Mrs. Consumer will direct that more space be made available for your products. We, as your salesmen, should sell the job you are doing as part of our everyday canned food discussions, and the job canned foods will do for them. We need more interesting facts with which to discuss your industry intelligently.

The third area is the food broker—a fellow who grew up with the canning industry but who finds that there has been some drifting apart because of new opportunities; opportunties that do not have all of the problems connected with the marketing of a canned food pack. A pack that reaches the consumer in sizable proportions through the trading market. A pack that is burdensome one year and in tight supply another. An unstable source of revenue because one area which overproduced undersells his principal who did not fare so well and who is not inclined to meet competition. Low-cost selling that you, as canners, create among yourselves. Unless we represent food processors who can be "near competitive" in this trading market, we both lose out. Since you all do a good job, the standardization of quality becomes very uniform and private label buying is on a price basis with quality of reputable canners in many instances taken for granted. True, some of you are better in reputation than others and do command a slight premium. This is the trading side of canned foods marketing. The other side of the food brokers' marketing of canned foods deals primarily with establishing and maintaining distribution of your branded product. A selling effort must be carried down to the point where Mrs. Consumer selects what she will buy. I believe that it is this activity that produces most of the problems for us who sell branded canned food products.

Here are some of the facts in the case: it takes exposure in self-service stores to sell products. If you are interested in selling your brand, this outlet is a "must" as part of your selling endeavor. If you do your own selling, then it becomes your responsibility. If you use a food broker, then it becomes his responsibility. Originally commissions were set up to provide for compensation for contacting distributors and headquarter units. This added sales function will cost you money if you do it yourself or it will cost the broker money if he does it. It is my suggestion that this highly controversial subject be evaluated in the individual case and an open-mind attitude be developed toward a mutual understanding of each other's problems. Remember that a broker is interested in concentrating his time on those lines he feels he can develop to his best advantage from the standpoint of long-term durability and profits.

Since we are facing some of these issues squarely, it may be prudent to mention that many thousands of cases of canned foods reach brokers' territories from brokers' principals without any compensation to the broker, eliminating, as potential customers, the receivers of the merchandise. This is one reason who food brokers have turned to branded products with which they feel they have an equity with stability and where achievements of today can be expanded further tomorrow. Also, that mergers and consolidations, plus the concentration of buying into centers of distribution, has resulted in a loss of dollars that will no longer work for you in the area where the consumer actually pays the cost when she makes her purchase. The pressure is mounting and more people are discussing daily how to equitably solve the problem of merchandise reaching the market from outside the assigned broker's territory.

Your efficiencies are highly commendable; however, because of these efficiencies, prices on canned foods remain low. Commission rates are the same and consequently, the dollars obtained are out of proportion to the goods and services required to operate the broker's organization.

The subject we have discussed is no major crisis. It is only part of the problem arising out of modern marketing. Food brokers in 1958 offer many more fine selling organizations than at any time in our history. Our canner principals are the best ever. Our basic aim is to get together to our best advantage. We are your partners in our common desire of producing living wages for all.

The Introduction and Promotion of a New Product

By Commander Edward Whitehead, President, Schweppes (U. S. A.) Ltd.

In attempting to talk on the subject of introducing a new product, I find it best to divide my material under three broad headings. First, I must tell you a little about our own experience, my company, its history and background. Secondly, I shall tell you something about myself, emphasizing personal factors bearing upon the views that I hold on this subject. Thirdly, I will talk about you.

If the first and second parts appear to outweigh the third or if this presentation appears to be unduly egotistical, it is because I know more about my company and myself. It would be temerity on my part to attempt to tell you, in any detail, what you should do when introducing a new product. I know so little about you, and I know nothing of the problem or the product; moreover, there is no one method, no one golden rule. There is more than one way of killing a goose.

Clearly one can't make sound plans and carry them out efficiently without the basic facts, without the data. By offering any kind of panacea one runs a considerable risk of killing the goose that is expected to lay a golden egg.

So may I begin by telling you a little about my company and its history. If you don't know this background, the significance of what I have to say later, the apparent incongruity of the developments that have taken place since Schweppes was introduced domestically in this country, will not be clear to you.

Schweppes was founded in England in 1794 when Jacob Schweppe, a Swiss from Geneva, set up business in Bristol on the west coast of England, with two English partners. They were wise enough to buy him out by the turn of the century but Mr. Schweppe's name has gone down in history as, I believe, the first man to produce, commercially, artificially carbonated waters. Since then the company has been entirely British.

Schweppes has had a long, honourable and highly respectable career. The company is recognized in Britain and in most places around the world as the leader in its field. It was one of the first to receive a Royal Warrant. In 1835 the Duchess of Kent, mother of the Princess Victoria (in the year before she became Queen), appointed us suppliers of carbonated waters to the Royal Household.

It is fair to say (though my predecessors on the board of the company would probably turn in their graves if they heard me say it) that our attitude toward sales, throughout most of our history, has not been exactly progressive. Until the end of the last war I think our sales policy could be summed up in these words: "If the best people drink it and the best places sell it, that is good enough for us." Fortunately the board recognised, about 1948, that perpetuation of this

policy would assuredly put the company out of business—if only because there were fewer and fewer of the best people left in England. So it was decided that an effort should be made to sell, in the true sense of that word, Schweppes to other people; to the "common people." This was in accordance with the best democratic traditions, bringing more of the good things to more of the people.

The success of this new sales policy, supported by not unskilful advertising, is demostrated by the percentage increase in sales which, over the last eight years, has been in the neighbourhood of 400 percent. This is to be compared with a total increase over the previous 100 years of 75 percent. And all this was achieved without departing one iota from our long-established standards of quality and service, and without reducing the price. Even in England Schweppes is substantially more expensive than the products of its competitors.

In line with this expansionist approach at home we began, about seven years ago, to expand abroad. For 100 years or more we have been exporting to most civilised countries of the world but, because the product was expensive to start with, and because of the cost of hauling it over oceans and lands, it was priced out of reach of most people by the time it reached its destination. Only the few, those with particularly discriminating palates or those with particularly generous expense accounts, could afford to drink it.

So, about seven years ago we began, for the first time, to adopt other companies in various countries who could be trusted to bottle for us, under our close supervision, using our essences and expertese.

Before I go on to develop the second part of my talk, concerned with myself and the introduction of Schweppes to the domestic market in this country, I must tell you just a little bit about my own earlier experiences.

Before I joined Schweppes in 1950 I worked in H. M. Treasury in London for three years, for Sir Stafford Cripps, then Chancellor of the Exchequer. My job was to try to find ways and means of explaining Britain's economic needs to industry. I concerned myself with the impact of the human factor on productivity.

During that time I sought to influence employers toward the use of certain principles developed in the fighting services. One of these principles was that of "pre-battle indoctrination" used so effectively by Field Marshal Lord Montgomery. The argument behind this practice was that men fight better when they are told exactly for what they are fighting, what is expected of them, how, when, and why. We contended that men also work better when they are similarly informed.

At the time Montgomery was putting this principle into practice, in North Africa, it is said that the Prime Minister, then Mr. Churchill, himself became an enthusiastic advocate of the practice and, when he was visiting other commands, he tried to persuade them to follow suit.

It is rumored—and if this story is not true it ought to be—that on one occasion Mr. Churchill found himself up against a particularly recalcitrant "old school" general, who, feeling that it was up to him to make his objections clear, remarked, "It is my view sir, that familiarity breeds contempt." Mr. Churchill looked at him for a moment before replying, "You know, general, without a certain amount of familiarity it is extraordinarily difficult to breed anything at all."

During the time I was at the Treasury and before that, whilst I was running a foundation, aimed at raising the standard of education and training in industry, I became convinced of the over-all importance of the human factor: the need to consider, at all times, what makes a man give or withhold his best, what makes him tick.

During my years with Schweppes I have had to abandon the objective study of these things but I am no less impressed by the significance of the human factor in the hurly-burly of commerce. In competition with the other fellow, one needs to use all the weapons in the armory and I have been amazed to find how little personal factors, the innate interest of ordinary people in other people, are used. These are largely neglected areas that can be exploited, entirely legitimately.

But first I must continue with my story. Realisation of this truth was, to some extent, forced upon me. Later I will enlarge upon this subject.

I came to New York in January, 1953, to consummate the largest and most important of our franchise arrangements, with the Pepsi-Cola Company. As overseas director and general manager of my company, I was responsible for setting up an organization to look after our interests in this country. I never dreamed, at that stage, that I would be called upon to play a more personal role—to become a human figurehead, a goldfish almost, as well as president of the companies we set up on this side of the Atlantic.

I won't dwell upon the reasons and arguments that overcame my initial objections to this suggestion. Suffice it to say that I perceived, as did David Ogilvy, our advertising agent who conceived the idea, Al Steele, chairman of Pepsi-Cola, and Sir Frederic Hooper, my boss, that I could by these means serve my own and my company's ends more effectively.

Now, four years later, we have had ample proof of the effectiveness of this unorthodox, highly personalized method of presentation in gaining widespread recognition and product acceptance. I have lived to experience its effectiveness in changing the course of my whole life.

The personal side of this story I can touch on only briefly. I was once a fairly normal, reticent Englishman. The virtual elimination of privacy (and therefore, of extra-curricular activities) and the constant intrusion of the job, would have been impossible to bear, but for my timely recollection of the teachings of Confucius. Freely translated, you will remember, he said, "When something unwelcome becomes inevitable, relax and enjoy it."

But whilst I have in some ways enjoyed the experience, I cannot disguise the fact that the load is sometimes heavy and the responsibilities onerous. Moreover I perceive that from the company's point of view there are distinct dangers in putting all one's good will eggs into one vulnerable basket. Personalization of the product, though obviously successful in the past, is a hazardous undertaking. The personality cult is apparently taboo in Moscow now and I suspect that few concerns, on either side of the Iron Curtain, would deliberately concentrate their ideology or focus their good will and reputation in the person of one man or woman (the hazards with a woman would, I submit, be greater).

At this stage the second part of my talk moves into the third, in that I shall endeavour to draw some conclusions and interpolate lessons that might be learned from our experience. My observations are, of course, entirely personal.

It is because company presidents and board recognise the dangers to which I have referred that more have not followed our example. A few have. And plenty have copied the beard, merely adding whiskers to their models; but that is the most superficial aspect of it—parsley round the ham bone.

Incidentally, I don't advocate beards as attention getters, or gimmicks, to which a publicity campaign can be pinned. In fact, I don't advocate beards for Tom, Dick and Harry at all. I am against the idea for everyone. For that matter, I am against any gimmick that is phoney or false. There is nothing false about my whiskers. They were grown for good sound reasons—keeping out the cold in northern latitudes and the mosquito and prickly heat in the South Pacific in 1939 (a very good year for beards). I kept them, when, eventually, I left the Navy, because I liked them; so did my wife who, with my children who had grown up swinging on them, wouldn't hear of my shaving.

But my point, here and now, is that personal idiosyncracies and manifestations of individualism, which I support on principle, must not be assumed for effect. That would never do.

In my view the public soon gets wise to a gimmick that is purely a gimmick.

For instance, in all the interviews—press, television and radio—that I have had over the past few years, I have found my interviewer and, by inference, the listeners or readers, particularly interested and apparently well disposed on learning that I had not grown my beard as a publicity stunt, that even in our *New Yorker* advertisements I have always aimed at verisimilitude and never agree to being photographed doing anything that is unnatural or wildly inappropriate. In most instances I either do the things that I have been photographed doing or something very like them. I am not saying all this to infer "what a good boy am I" but merely to emphasise the fact that whilst I openly advocate individuality and independence of mind, I do not uphold oddity for its own sake, with nothing to support it.

An excellent example of independence of mind and the capacity to question established ways is contained in a book I read recently entitled, *All out of Step*. It is the autobiography of Gerard Lambert, who made countless millions by breathing new life into his semi-moribund family business (that makes Listerine). He realised his assets in such a way that they were undiminished by the great depression and enjoyed, thereafter, the life of an international yacht-racing "bonviveur." All as a direct result of his capacity to take a "new look" at problems of advertising and merchandising.

I said just now that personalisation of the product has not been entirely unsuccessful in the past. Henry Ford and Walter Chrysler did not suffer as a result of the publicity that accrued to those pioneers of mass production of automobiles.

Sir Thomas Lipton gained a world-wide reputation for his tea, whilst he was admired for the gallantry which he showed in losing so consistently, America Cup Races. I think his reputation was enhanced too, by his eccentricity. Even before he was knighted and became famous, he would say to a cab driver when he paid him, "No tip, but from now on you can boast that you have carried Thomas Lipton in your cab." Regardless of whether the cab driver appreciated this honour, it is pretty certain that Thomas Lipton will have been remembered and often quoted.

Short of concentrating upon one person, I suggest there is much that could be done in the way of stimulating interest, in almost any product, through the people, past and present, concerned with it.

People tend to be more interested in people than in things. There is just so much you can say about your product. Or rather, there is a distinct limit to other people's interest in what you have to say about it. Therefore I am advocating exploration of the possibility of creating interest in the individuals, past or present, concerned with it. Are there not some outstanding individuals who, in the past or present, have, by their independence of mind, advanced the cause or increased the fortunes of your concern? If so, others might be interested to hear about it.

So often there is an intriguing story that would excite public interest, if only it was unearthed and properly presented. The origins and growth of almost every business are, in themselves, romantic stories—especially insofar as they concern people; those who played prominent roles in devising new processes and finding new uses for materials. (Think of uranium, described, in a dictionary printed at the beginning of the century, as "a useless metal, found in many parts of

Commander EDWARD WHITEHEAD

the globe.") No less exciting are the stories of entrepreneurs who, by their ideas and efforts, expanded little businesses into big ones.

Why not take a look into the origins and history of your own concern? Why not examine your own recent developments and current activities and see if there are not many interesting stories associated with them that would interest the public, and therefore increase its estimation of your company and its products?

Incidentally, in all the talk and reading matter that has been put out on the subject of advertising and publicity, no one has been able to define exactly what it is that impels a customer to buy a particular product and remain faithful to it. It is easy enough to enunciate contributing factors (amongst which, of course, there must be the innate quality of the product and its availability) but I am talking of those less well defined factors, those elusive considerations that cause people to think well of us or our products and, as a result, to buy them.

To quote a recent instance. When H.M. The Queen visited New York recently, I obtained special dispensation from the authorities in England to draw public attention, by means of a large space advertisement, to the fact that we were honoured to share in the welcome of Her Majesty to this country, that we were proud of our long-standing association with the Royal Family in Britain, which we had served continuously for the last 125 years. At the time that this advertisement was being prepared I found many, including some of the experts involved, were against it. They said it was of doubtful commercial value as it did not even mention the product. True, but who can say what it is that makes the reader of an advertisement decide that he likes or dislikes the company or the product? The unsolicited reactions that I personally have collected as a result of that advertisement have satisfied me completely that this was a valuable advertisement for Schweppes Tonic.

I hope I have succeeded in making my point. In sum, I think our experience demonstrates the fact that the public is interested in people and, provided it is satisfied that a man upon whom attention has been focused is not a phoney, it will go on being interested. A façade with nothing behind it wouldn't work. The public would see through it and quickly lose interest.

From this I draw the conclusion that personalities can be used with advantage in introducing a new product, on a local or upon a national basis.

Therefore, your greatest asset, in terms of publicity (and, probably also, in terms of actually doing the job of introducing a new product) is a personality at the helm who is, by nature, interesting; a man who doesn't mind too much what other people say or think; a man who is capable of analysing the situation, of reaching a conclusion as to what should be done and of doing it, come hell or high water.

If time allowed, I would like to have developed a number of other aspects of this subject. But to say everything that there is to say, on any subject, is to be a bore—and it is impossible anyway.

I realise that you, in your widely different businesses, must face the problem of introducing a new product with all kinds of different considerations, that I am not able to touch on. You have to decide on pricing policy. Are you going for maximum profit or maximum sales? If you start with the former, when and should you reduce your price to aim at the latter? You have to decide if a competitive price is a must.

Answers to these questions can be found only after a complete market survey. For instance, my insistence upon the existence of a market for a high quality product at a good price—

above the competition—is relevant only if you have access to the proper outlets. But if your pattern of distribution gives you access to that part of the market that caters for buyers of discrimination, I would urge every effort toward selling on quality, even though the price must be higher than that charged by your competitors.

Years ago when I was visiting S.S. Pierce & Co. of Boston (who, incidentally, have been selling Schweppes for about 50 years), I was shown a can of corn which they sold at a higher price than other cans, of similar size, available in most other stores. When the cans were opened and a fork was rested on the top of the corn, it stayed there, on Pierce's product, but it quickly sank to the bottom of the lower priced can. The variety of corn and the contents were much the same, according to the label, but there was no doubt as to which was the better buy.

Fortunately there is a substantial market for the better product. In my view the size of this market is growing. More and more people are beginning to discriminate. As more and more can afford to, they take pleasure and pride in sorting out the first from the second rate. It is wisely said that you cannot fool all the people all of the time and, if your product can be proved to be worth the money, and you make it available in the right places, at the right time, there is no reason why you should not get a good price for it.

It is, of course, essential that a high quality product should be subject to the most exacting standards of quality control. The product must be demonstrably the same, wherever it is sold. I am quite sure that the strength of our position in the market stems from the fact that our products have been of the same high quality for so long that both the trade and the public have complete confidence in what they are buying. In short, price is not the only factor. Quality counts and in my view it will count for more rather than for less in the future.

You will have gathered, too, that in my view quality counts in people too.

Does It Pay to Educate the Editor?

By Esther Foley,
Home Service Director,
Macfadden Publications, Inc.

Does it pay to educate an editor? In the vast system called public relations many devices are used to keep an editor aware of the market—publicity releases, sampling, demonstration, mailings, and personal calls. This is costly. Someplace, somewhere, in any organization there must be an executive who says: "Is it worth all that?" The answer is not an easy one. In fact, the very word "educate" is often challenged. I have heard the word "instruct," "influence," "alert," as well as other words, used by those who seek to shape editorial pages.

After many years in this end of the business, as an editor I still think the word "educate" is the best. I am not talking of promotions that have shock impact because of a joining of editorial and advertising effort. These promotions can be judged for value at once, and their effect, though valuable, is short lived. I am talking of "educate" in its basic terms—by dictionary definition—that is, to strengthen the mind and to fit it for a special calling by systematic instruction. In this present case, of course, to fit the mind to an understanding of the canned food business, its place in the economic life of our people, and its place in the economic life of our particular work, the publishing field.

How much of the material that your public relations effort sends to our desks is valuable to us? The answer is easy: as much of it as is intended to educate.

There is not time to consider the effect of such education in all magazines. The average circulation per issue of all ABC member magazines, general and farm, reaches 181 million. But we can consider the effect of such education on a few of the magazines whose business it is to appeal particularly to the homemaker and housewife. In the food pages, mainly staff-written, illustrated and edited, the food editors build a bridge between you and their readers. This bridge carries your message and it becomes part of a contemplative editorial atmosphere. These pages provide space for instruction, nutritional sidelights, and they add gayety and charm to the job of cooking, and use the grace and power of both illustration and copy. This does much to enhance the brief advertising messages which appear on pages surrounding the food editorial.

To illustrate, here are ten slides, from ten magazines, showing illustrations from ten articles published during the last year:

American Weekly (Feb., 1957)

Soup Dish Dinners—If you show a woman how to serve it, she'll try a menu new to her. This article features 35 canned foods.

Family Circle (Feb., 1957)

Wonderful Hearty Casseroles—Nothing catches a woman's eye more quickly than ground beef dressed up. This article features 4 canned foods.

True Story (Feb., 1957)

When the family meets for dinner, spaghetti is one of the nation's favorite meat stretchers, and here we show it just one step away from the dinner plate. This article features 17 canned foods.

McCall's (April, 1957)

Cheese pie with fruit glaze—If there is anything that will stop a woman and make her read, it is a chef trick. And here is one in a colorful fruit glaze. This article features 4 canned foods.

This Week Magazine (April, 1957)

Get Set for Super Cooking! How will cooking and eating habits change in the next 10 years? Here is a peek into the future. This article features 7 canned foods.

Sunset Magazine (July, 1957)

Foods of Old Mexico—Living up to its regional importance, this picture both compliments and stimulates the Pacific Coast's idea of hospitality. This article features 7 canned foods.

Farm Journal (Oct., 1957)

Covered Dishes to Tote—The traditional covered dish supper season is on its way, and this article starts it off, featuring 21 canned foods.

Ladies' Home Journal (Nov., 1957)

Thanksgiving at Apple Yard Center—Tradition with the magic flair of modern convenience foods stands out here, and this article features 21 canned foods.

American Home Magazine (Jan., 1958)

Take a can of apples—And here is one of the old fashioned desserts which hold onto the modern kitchen with both hands, apple turnovers. Here we show only one of many illustrations, turnovers at their flaky best. This article features 19 canned foods.

Good Housekeeping (Jan., 1958)

Main Dishes for Calorie Watchers—Wouldn't that main dish stop you, hungry from a self-imposed diet? This article was written previously (1956), but now is offered as a colorful service booklet. Features 39 canned foods.

This is by no means a run-down of all canned food mentions, in any magazine, nor is it saying that only these magazines mentioned canned foods. But these particular slides are important to you for two reasons?

(1) They were made from articles the editors themselves selected, and they are proud of them.

(2) They represent many individual groups within the large homemaker group. We have here the women's service books, the new "group" action or togetherness books, the grocery store book, a farm book, a romance book, two large Sunday supplements, a shelter book, and a regional book.

In spite of mass circulation figures, women with distinct and different interests will always seek and buy

magazines edited for the particular interest that dominates their lives. These different books, plus others in their class, serve women within the homemaking group, according to their special interest.

To further clarify this viewpoint, listen to what the editors say:

Eleanor Crook, *The American Weekly's* Amy Alden. Circulation about 10½ million.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "A busy homemaker, with a hungry family to satisfy; interested in new ideas, somewhat inhibited in her desire to be a creative cook by a husband's conservatism."

Your reason for selecting this particular topic for this particular month: "Even in those sections of the country where winter never really takes hold, February is likely to bring chilly evenings. What could be more welcome than the aroma and warmth of a well-seasoned, hearty soup?"

Grace White, *Family Circle* food editor. Also known as "Julia Lee Wright." Circulation serving more than 4 million families.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "A homemaker, mother of three children, facing the question she meets every day of the year, 'What'll I fix for dinner?' Over the past two years, our reviews of like articles show consistent high readership and unsolicited reader mail confirm their popularity."

Your reason for selecting this particular topic for this particular month: "To acquaint the reader with the vast group of food products available to her by industry, and to reflect to industry the needs and desires of homemakers who make up our readership. Look twice, for it features canned foods that our stores like to promote in February."

Clementine Paddleford, food editor of *This Week Magazine* and of the New York *Herald-Tribune*. Circulation 12 million plus.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "A modern youngish homemaker with children, possibly a working mother at least busy with community affairs, suburban home, the family of middle-to-better means. She is a woman who prizes happiness and health for her husband more than the ambition for him to be a wealthy man. The family does things together and week ends are reserved for relaxed pleasure."

Your reason for selecting this particular topic for this particular month: "It was our special spring issue when there was space enough for me to feature an important 'to me' subject, 'how we can adjust to the world that's coming.'"

Lou Pappas and Annabel Post, staff home economists, *Sunset Magazine*. Circulation over 600,000. Includes the 7 western states (Washington, Oregon, California, Idaho, Nevada, Utah, Arizona) and Hawaii.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "A suburban homemaker wishing to entertain a group of a dozen or more friends at an original patio buffet in the summertime."

Your reason for selecting this particular topic for this particular month: "The casserole dishes lend themselves to outdoor entertaining and preparation in advance."

Esther Foley, home service director, Macfadden Publications, Inc. Circulation 2,500,000.

A brief picture of the reader you saw in your mind's eye, as you wrote

ESTHER FOLEY

this editorial: "Our readers are wives of laborers, with children in the baby and run-about stage, a homemaker who is tied to the house by the shifting working hours of her husband and the age groups of her children. She must feed them well, but heartily, and prepare food that can stand waiting without being hurt. A filler food is her best way of stretching a meat dish; gravy and catsup is the best accompaniment."

Your reason for selecting this particular topic for this particular month: "February is a bitter month, and the warm fragrance of a simmering spaghetti meat dish gives off comfort, even from the picture on the page!"

Helen McCully, *McCall's* food editor. Circulation 5,200,00 plus.

A brief picture of the reader you say in your mind's eye, as you wrote this editorial: "The reader we had in mind has a family, loves to cook and especially loves to prepare 'show-off' foods such as these fruit pies. Most desserts are show-off, which is why we on *McCall's* believe desserts of all kinds are so popular. After all, what cook doesn't get a nice, warm, inner glow when the people around her table say, 'Boy, is this good!'"

Your reason for selecting this particular topic for this particular month: "We chose these fruit pieces for April publication for two reasons: the new fruits were not yet in season and the canned fruits lent themselves particularly well to this recipe; second, this is an unusually easy and inexpensive cheese pie to make, yet it still has the 'show-off' qualities we know are important to *McCall's* readers."

Nell B. Nichols, director, food and equipment, *Farm Journal*. Circulation guarantee 3,400,000.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "Busy farm women, who have full or part-time jobs off the farm, who help more with outdoor work now that farms are highly mechanized, and women who take an active role in church, school, Grange, Farm Bureau, extension, and other community affairs. For these women in 1957 we featured a series of food articles on convenience foods under the general heading 'The Busy Woman's Cookbook.' Purpose, to help farm women lose guilt complex about cooking the easy way with prepared and partly prepared foods, and to show them how to be creative using handy foods."

Your reason for selecting this particular topic for this particular month: "October finds school, church and community life getting into full gear in rural areas. The covered dish supper season starts in a big way. That's why we featured the 'Busy Woman's Company Cookbook.' The food section has three stories and the one illustrated on the slide is 'covered dishes to tote.'"

Louella G. Shouer, food editor, *Ladies' Home Journal*. Circulation 5,448,570.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "The young married who demands a simplified meal, economical, quick, adaptable for small or large groups, with accent on the exotic, the special gourmet touch. This woman who heads a family of growing children and represents the broadest reader category, needs variety and inspiration to elevate a monotonous chore to an imaginative, challenging pleasure. This is the reader for whom the *Journal* plans spreads like 'Thanksgiving at Appleyard Center.'"

Your reason for selecting this particular topic for this particular month: "All readers expect a traditional Thanksgiving meal. The Journal's effort regarding food fare for special occasions is to contribute imagination and flair — interesting food ideas—while maintaining the feeling of tradition in the holiday gathering. The major portion of *Journal* editorial is still devoted to the solid family meal, but the concentration is on ways to enhance and glorify that meal and make cooking it a delight."

June M. Towne, director, food department, *American Home Magazine*. Circulation 3,200,000.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "As I plan this spread for 'Take a Can of?' I see all the faces of our readers who do open cans. They are working mothers, or 5 o'clock cooks, yet aspire for recipes that are not just can label suggestions."

Your reason for selecting this particular topic for this particular month: "Monthly we select such a 'can' topic as *American Home Magazine's* recognition that the homemaker needs inspiration for the more than 1,095 meals a year that she must plan."

The Institute and the Bureau of *Good Housekeeping*. Circulation 4,200,000.

A brief picture of the reader you saw in your mind's eye, as you wrote this editorial: "The woman who needs to guard her own or some other waistline. These recipes allow her to do this with family dishes in which the nutritive values have been retained or enhanced. Canned foods, because of their variety and quality, naturally played a leading role in developing these recipes."

Your reason for selecting this particular topic for this particular month: "Since the calorie watchers' theme has year-round appeal, the selection of the month in which this feature appeared was largely incidental. 'Main Dishes for Calorie Watchers' has been reprinted in combination with our 'Desserts for Calorie Watchers' feature, and is available to readers for 25 cents a copy."

Conclusion

There, now, what do you think? Has it been rewarding to you to educate the editors? The results have been widespread, continuous, and pleasant, straight through the year. But right here I'll pull a switch. The bridge which the editors build to carry your message out through the wide and varied readership of the homemaking magazines is a two-way street. It can bring back to you, if you will let it, news of the homemaker—her ways, her needs, the new forces that will shape her life tomorrow!

N.C.A. President A. Edward Brown presents to Paul J. Cupp (right), during the Marketing Session, an illuminated scroll in recognition of Mr. Cupp's contribution to the Philadelphia Project. Text of the scroll is reproduced below.

Award to Paul J. Cupp, President of American Stores Co.

Following is the text of the scroll presented during the Marketing Session to Paul J. Cupp, president of American Stores Company, in recognition of his contribution to the Philadelphia Project:

National Canners Association
Award of Special Merit
Presented to
PAUL J. CUPP
President, American Stores Company
for

significant contributions to the science of retail marketing of canned foods and for his special generosity in providing the facilities of an operating supermarket laboratory in which to conduct the Philadelphia Project marketing studies.

Attest:

A. Edward Brown,
President

Carlos Campbell,
Executive Secretary

January 21, 1958.

While you cannot use all this information, as we cannot use all of yours, some of it might help you in marketing your output today or play a part in making decisions for your plans for tomorrow. Some of you tap us on the shoulder. But to all of you we say that we really know a great deal about our homemaker, and we like to talk. Try us and see. It might be worth it!

All the editors join me in thanking you for making their jobs exciting and interesting and of real value to their readers. And, I thank you for listening.

RESEARCH SESSION

PRESIDING: EDWARD E. BURNS, 1958 President of N.C.A.

ADDRESS: "Can You Live with Your Blood Cholesterol?"—Dr. ROBERT OLSON, Director of the Nutrition Clinic, Falk Clinics, Pittsburgh Medical Center

ADDRESS: "Telling Agriculture's Story Dynamically"—Dr. J. JEROME THOMPSON, Vice President, Chas. Pfizer & Co., Inc., Brooklyn

ADDRESS: "Research on Foods—from the Field to the Can"—Dr. EMIL MRAK, Head of the Department of Food Technology, University of California, Davis

AN ABSTRACT OF

Can You Live with Your Blood Cholesterol?

By Dr. Robert E. Olson, Pittsburgh Medical Center

Atherosclerosis and its complications are the leading causes of death in the United States at the present time. The elucidation of pathogenesis of this disease, therefore, constitutes an important challenge to medical researchers; and, in fact, many laboratories in this country and in other parts of the world are engaged in intensive research on this subject.

Evidence at the present time strongly suggests that atherosclerosis is a disease of multiple etiology in the sense that many factors bear on the final development of the lesion (atheroma) and upon the complications which result in clinical disease. It is probable that the disease represents a very complex interaction between host, environment, and an "agent." This relationship has been recognized by epidemiologists in other situations of disease. A diagram can be drawn which shows the classical triangle of the epidemiologist relating host, environment, and "agent" in the lower portion, and a second triangle which portrays the relationship to atheroma formation of local and humoral factors in the host arising from physiological activity. It would appear that the "agent" for atherosclerosis is not an independent variable, as in the classical situations of infection, allergy, or poisoning, but is a dependent one. Further, it seems clear that the contribution made by the host and by the environment to the "agent" in given cases may vary widely so that simple regressions are virtually impossible. In special cases a number of subliminal stimulae may operate to finally activite the "agent." Some of the pertinent variables which appear to be contributory in the host include genetic endowment, race, sex, endocrine balance, and psychic state. Some of the equally pertinent environmental variables include diet (fat as well as other constituents), drugs, exercise, social, economic, and cultural factors, including occupation and climate.

At the present time, one can delineate local factors involving the artery which include hemodynamic ones related to blood flow turbulence and pressure; metabolic ones intrinsic in the arterial tissue, which control its respiration and lipogenesis; structural ones relating to the differentiation of intima, internal elastic membrane, and other components of the arterial wall; and traumatic ones relating to injury, ulceration and repair. Equally important humoral factors appear to include the serum lipids and lipoproteins, clearing factor which is in some way related to heparin and the coaguability of the blood. It appears that these local and humoral factors interact within the environment to produce the atherosclerotic lesions. Clinical disease may be delayed until some additional complication arises such as thrombosis or perforation.

In a study of atherosclerosis, attention should be paid to both the local and humoral factors. Experimentally, it is extremely difficult to devise studies which will adequately elucidate the role of the local factors, although progress has been made by studying the metabolism of surviving arterial tissue. The humoral factors, which include the serum lipids and lipoproteins, are perhaps easier to study, and intensive work is underway. Many of the data are interesting and may be highly significant in devising ultimate preventive measures for the disease. At the present time, however, many of these factors are highly controversial, particularly the influence of given dietary constituents upon the level of serum lipids and lipoproteins.

Keys and his associates have produced epidemiologic evidence that many populations show an association between the incidence of coronary artery disease, the alteration of serum cholesterol, and a high intake of total dietary fat. On the other hand, Drs. Arhens, Kinsell, and Beveridge independently have produced evidence to suggest that the amount of unsaturated fat in the diet, particularly the linolaic and arochidonic acid containing fats are even more important regulators of serum cholesterol than the level of total fat. As far as practical diet therapy is concerned, therefore, one is hung upon the dilemma of whether or not to lower the total fat concentration of the diet or increase the proportion of unsaturated fat.

In our laboratory, we have shown that the lowering of total dietary protein markedly to levels of 25 grams a day (approximately 5 percent of calories) in human subjects has a marked hypocholesterolemic effect which is not overcome by addition of as much as 90 grams of butter fat to the diet. In experimental animals, we have shown that the presence of choline and methionine in the diet is essential for the manifestation of betalipoproteinemia. It is probable that many of the observations made on populations where the diet is poor in

Dr. ROBERT E. OLSON

protein and fat are as much due to the low protein as the low fat. Other experimental evidence would suggest that the liver is a critical organ in the elaboration of betalipoproteins which in turn may influence the progression of atherogenesis and that the effect of diet is an effect exerted upon liver function.

Certainly important variables in the pathogenesis of atherosclerosis have been delineated and it appears to me that the chief job of medical researchers at the present time should be further delineation and quantitation of these factors before public health programs can be elaborated. Techniques for the study of genetic, endocrine, and psychological contributions of the host to the problem, and further study of the local factors which predispose vessels to atheromatous changes is sorely needed. General practitioners, as well as clinical investigators, can conduct meaningful studies of the effect of varying diet and other environmental factors upon the natural course of atherosclerosis. Biochemical study of the mechanism by which diet influences serum cholesterol level may open new avenues for the control of the humoral factors. In my opinion, it is a time for intensive basic, clinical, and further epidemiologic study.

In a few years, we may have the additional information which may enable us to launch a program of public health education with the conviction which we feel in recommending fluoridation, VD and TB control, antibiotic therapy in streptococcal disease and other established preventive programs in public health.

Telling Agriculture's Story Dynamically

By J. Jerome Thompson,
Chas. Pfizer & Co., Inc.

The invitation to me to address this group stated very accurately, "You may not be very familiar with the canning industry."

This point should be emphasized because it shows up a condition rather common among managements throughout the complex of industries associated with agriculture.

Frankly, while the chemical and pharmaceutical industry has a very large stake in agriculture I knew only generally about the great contributions to agricultural progress the canning industry has made through the years.

This called for some boning up. It was fairly easy to find out that canning got its start in France about 150 years ago when Napoleon awarded a 12,000-franc prize to Nicolas Appert for a process to preserve succulent foods.

In this country Thomas Kensett of Baltimore and William Underwood of Boston were important pioneers in your industry. Reference works are full of other interesting facts and figures, such as the estimate that one out of every 12 pounds of our total food supply is a canned food, in a tin or glass container.

You certainly could rattle off this information at the drop of a hat, so there's no reason to play it back to you. On the other hand, how many of you know that the addition of a broad-range antibiotic to the diets of poultry laying flocks can increase egg production at an average rate of 25 percent per hen per year?

Have you heard of current experiments in which the tranquilizer drugs, so widely used by humans, are bringing about amazing increases in rates of gain and feed efficiency when added to rations of beef cattle and sheep?

These are the things the chemical and pharmaceutical industry are doing.

The point is that while we have a common interest in the welfare of agriculture as a whole, each of us knows entirely too little about what the other is doing. Since this is true of management which is directly concerned with keeping agriculture in a prosperous state, you may be sure that the public at large wallows in ignorance as far as we are concerned.

Clearly all segments of our agriculture must team up to tell the industry's story dramatically . . . forcefully . . . and in terms the layman can understand.

Let's come back to this a little later and concentrate for the moment on some aspects of research, for research is the focal point around which we must weave agriculture's story for the education of the public.

Management's attitude toward basic research—indeed toward all research—is built up in the school of hard knocks. In a sense, management in the chemical and pharmaceutical industry may have been more fortunate than some others because the field is one of the most competitive in the economic structure. You stay on your toes or else.

Long experience, and observation of other companies both in and out of the pharmaceutical field, make it clear that basic research is the most important kind in which we can engage.

Historically it is equally true that the company which does not undertake a vigorous research program sooner or later disappears from the scene entirely or declines to a place of minor importance.

There is no need to name names. You know very well the corpses, now lying in the economic graveyard, which once were names to be reckoned with. They just faded away for lack of fostering sufficient research.

On the other hand, industries which have demonstrated willingness to support the search for more knowledge have grown impressively and have made valuable contributions to the nation in the form of new products.

The growth of all drug and chemical companies has been primarily the result of the successful development of new products out of research laboratories. My own company is frank to admit that its rapid expansion is due almost wholly to sound research programs vigorously carried out. In fact, more than 90 percent of Pfizer's sales growth has originated in its own research. Pfizer's ethical drug products have grown from a single, ethically promoted drug in a single dosage from in 1950 to more than 100 drug products for human and veterinary use in more than 1,000 dosage forms. Your President has asked me to tell you our research program.

Founded in 1849, Pfizer was a moderate-sized operation until 1950, doing a bulk business with other drug houses which packaged and re-sold Pfizer products under their own names.

The company's association with the food and beverage industry goes back many, many years. For one thing, we have long been producers of citric acid.

Research is the guide which has led us down the road to tremendous expansion and diversification. Our work in fermentation chemistry fitted us admirably for playing a large part in helping to break the bottleneck in mass production of antibiotics during World War II.

This set us off on a global search for new and better antibiotics, climaxed by the discovery of Terramycin in a Pfizer larobatory in 1950.

In turn the usefulness of Terramycin and other antibiotics in human medicine prompted exploration into new uses for these drugs in the agricultural field—to promote health and rate of growth of livestock and poultry.

Incidentally, in one piece of basic research we spent $2 million to determine the molecular structure of Terramycin. We did not expect this effort to pay off immediately, but we had an extraordinary piece of good fortune. When we took the Terramycin molecule apart and then put the parts back together, we discovered a closely related chemical structure which turned out to be a powerful new antibiotic, tetracycline.

Successfully solving the riddle of Terramycin's structure inspired still more research. We are now trying to

find out how the antibiotics accomplish their miracles. Again this is pure research, because we have no way of knowing what the benefits may be in the end. We think the knowledge, once we have obtained it, may enable us to tailormake antibiotics for specific uses.

The outlook is promising, but there is nothing definite to announce as yet.

Somehow, research always seems to breed more research. Having established the usefulness of antibiotics in agriculture, we followed naturally experimentation with the drugs in food preservation.

This is an area in which your industry and mine have unusually close bonds. New antibiotic preparations already are being widely used to keep dressed poultry fresh over a longer period of time.

Agri-mycin, a combination of Terramycin and streptomycin, is used effectively in combatting certain diseases of interest to canners. These include fire blight of apples and pears, leaf spot of tomatoes and peppers, halo blight of beans, and a number of others.

The antibiotics also show much promise in the control of post-harvest spoilage which, of course, can affect the quality of canned fruits and vegetables. A recent example, reported from Finland, showed a marked reduction in spoilage of canned cucumber pickles through the use of Biostat. This product is used in minute amounts in icy slush, into which the food is plunged for very brief periods.

Again, experimental results show the possibility of improving quality of canned salmon, tuna and sardines by using Biostat to hold down bacterial growth prior to canning.

Quite naturally, questions have been raised about the possible harmful effects of adding antibiotics to human foods. Actually, a process such as canning will usually destroy any remaining antibiotic activity. In any case, we believe that subsequent events will show that a small amount of Terramycin in food is beneficial, not harmful.

This much is certain: Further research is the tool we will have to use to get the answers to these and many other questions.

Research thrust Pfizer onto the agricultural scene almost overnight, and continued faith in research has helped us a build up a position of strength in a highly competitive industry.

Our 700-acre Agricultural Research and Development Center near Terre Haute, Indiana with over 100 people on its staff, marked its fifth anniversary last spring. It has been gratifying to see other companies in the field arrive one by one at the conclusion that a facility of this kind is essential. We heartily believe the old adage that imitation is the subtlest form of flattery.

This is more than just "keeping up with the Joneses." It is recognition by worthy competitors that to stay in the race they must contribute their full share toward the scientific advancement of agriculture.

In simplest terms, management is no longer faced with the question of shall we support research. The issue now is, how large shall our research program be?

Never before has so much money been spent on research of all types, and still there seems to be general

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agreement that it is not enough. Certainly we are nowhere near the point of diminishing returns.

Where do we draw the line? That question can be answered indirectly by pointing out that in Pfizer we spend about $5 for research out of each $100 of sales income. This is close to the figure for the entire pharmaceutical industry, and only the electronics industry spends a higher percentage for research.

At the same time, management can never lose sight of the fact that our stockholders will continue to expect a fair return on their investment. This means we must strike a balance.

We must develop enough short-term research projects which promise immediate dollar-and-cents returns to foot the bill for the longer range programs we all agree are essential. This is no more . . . no less . . . than hard-headed business sense.

Your research director is not given carte blanche to ride off in as many different directions at once as his fancy may dictate. Instead, each project is carefully screened in advance.

In Pfizer a number of yardsticks are used to measure projects and I suspect that these benchmarks, or something closely akin to them, are pretty widely used throughout industry today.

Success in research can be measured in two ways: (1) the achieving by the researcher of a goal which has been defined for him by his own curiosity or the nature of his work; and (2) the achievement by the researcher of a goal set for him by management.

In the first case, the worker may come up with some knowledge which is not immediately useful and which may not be applicable for the foreseeable future.

The results of this kind of research are never discarded as having no value. The results are knowledge in its purest form, and one day this knowledge may inspire a new approach to another problem not directly related to the original one. Or, in the mystical ways of the mind, it might cause a click in someone's thoughts that will produce something immediately applicable.

In the second case, successful research being the achievement by the scientist of a goal set by management, the value is much easier to assess and the results are more immediately profitable.

Naturally the most valuable research of all is that in which the worker can satisfy his own curiosity and serve the immediate interests of the stockholders as well. Unfortunately, these desirable ends too frequently cannot be wrapped in the same package.

We are reminded often, and correctly so, that the well-springs of basic knowledge will dry up if they are not consistently replenished. Obviously, if that ever happened there would be no foundation on which to base new products and new technological developments.

Once you grasp these economic facts of life about research, the problem of ordering your affairs becomes less difficult.

First of all, management is faced with the need to reconcile many diverse viewpoints within its own company. The research director, a sales executive, the company controller, and so on down the list usually want something entirely different from research.

Management must take an objective look at all of these shades of opinion and come up with a sound research program without throwing any of the cogs in the corporate set-up completely out of kilter. Decisions, therefore, are very likely to reflect group rather than individual opinions.

Again there is the vital question of keeping the company's fiscal affairs in a healthy state. Constant evaluation of research projects, by a group rather than an individual, is one way to accomplish this. Pfizer makes such appraisals in regularly scheduled review conferences and the system has worked well for us.

A number of very useful yardsticks can be applied easily to the less difficult projects. These are simple dollar-return formulas to guide us in selecting projects and in measuring effectiveness of those already under way.

For example, we require that each $1 going into new products or applications research shall return, eventually, $3 in new sales volume.

In process improvement research, we require that every dollar spent on research shall trim $1 from production costs during the first full year the improvement is in effect.

Obviously, any industry would fail miserably in fostering a great deal of vital research if it attempted to apply such regulations across the board to individual projects.

These yardsticks are not suitable for measuring basic or long-range efforts. They can be most useful in determining whether there are enough short-term projects, carrying the promise of immediate profits, to counterbalance the fundamental research we all must undertake.

To any one not familiar with the highly competitive situation in our economy, this may seem to be an unscientific approach to a scientific problem. Actually, it is no such thing. The blunt truth is that unless we apply such yardsticks, our research budgets might balloon out of all proportion to reality and we might expect far fewer tangible results.

As vital as research is to any corporation, no company can afford the luxury of fostering a large percentage of projects which fail completely. If a research staff were permitted to go its merry way unguided by budget considerations, something like this probably would happen:

First, the number of research failures would rise; then the cost of the few successful products developed would go up because management would feel bound to recoup its losses. Before long the consumer would realize, through his pocketbook, that a company run like that didn't deserve his patronage and he would boycott its products.

To sum up:

(1) Every company and industry must vigorously support a research program to insure its own survival.

(2) Each research project must be carefully evaluated to make certain that, over-all, the program will pay its own way.

The canning industry, at least from the standpoint of an outsider, has a wide open field to improve its position through research.

Convenience foods for the kitchen shelf made news in 1957.

Two new ways of preserving fruit juices have been developed. Apple and grape juice superconcentrates yield fresh-tasting juice after being kept as long as a year at room temperature.

Orange juice powder is being produced for such large users as the armed forces and institutional food services. Tomato powder is a reality.

Surely such developments as these have convinced you that the prospects for exploitation and expansion are limitless in the food field.

Research can assume many different aspects. Marketing studies, exploration of production methods, new product development, and investigations of new uses for existing products are a few of the varieties of research which will continue to pay off handsomely.

Then there is the intriguing prospect of developing a wholly new production method. As you well know, there was no such thing as quick-frozen food 20 years ago.

Fifteen years ago the fats and oils people launched an all-out research program aimed specifically at finding out how their products could be more efficiently used in the kitchen.

These clever planners had special recipes prepared to accompany their products so that if the housewife tried to make a substitute for the required fat or oil her dish turned out an abysmal failure.

Some enterprising leaders in the field carried research to the point of including with certain prepared mixes the utensil in which to do the baking.

The utensil, being disposable, capitalized upon the known fact that nothing discourages a housewife quite so much as a sink full of dirty dishes. At the same time, the recipes with these mixes assured even the novice homemaker of a superior finished product as long as she followed the simple directions.

Take another example. Twenty years ago the soft drink industry embarked upon a significant marketing research program. The result is that today their sales through vending machines alone are greater than total sales 20 years ago.

These outstanding results have inspired coffee makers and milk dealers to move into mechanical vending as a means of stimulating sales. Again results have been phenomenal.

These are some of the challenges that a person outside your industry can see peeping through.

Just take mechanical vending alone. Automatic mechandising of meals from soup to nuts has been a reality for some time. The vending machine has proved its merit as a stimulus to impulse buying. By making a product easily available, it reaches outlets in schools, industrial plants and other places which have never been tapped.

From your standpoint, the new era in food vending offers an opportunity for great point-of-sale advantage.

Consider the possibilities of 24-hour-a-day sampling. The machine not only eliminates human frailty; it literally can "sell while you sleep," dealing out samples of coffee, candy, or what-have-you to potential new customers.

Or, look at another fruitful field for research. The possibilities for applying the antibiotics in the food and nutrition fields have been given only a once-over-lightly treatment.

If the wonder drugs work successfully in extending the shelf life of some foods, surely their effects on many others are worth investigating.

These are only suggestions. You know your field inside out and it would be strange indeed if you were not thinking constantly about how to use research to improve your position.

In this connection, an industry should never hesitate to make its products obsolete by introducing something newer and better. If one company doesn't, another will.

The pharmaceutical industry is a close second to the auto makers in following this policy of deliberate obsolescence. New and better products are consistently introduced, often completely replacing the old and expanding the total market in so doing.

Thanks to continuing research, the benefits of this policy are numerous.

The feed industry, the veterinarian, as well as the medical profession, are provided with constantly improving products.

We can take advantage of new developments in packaging, not to mention new claims for products.

Lastly, company personnel are filled with a spirit of growth and vigor which cannot be built up so well by any other means.

Our industries have a great common responsibility: to maintain a sound base under agriculture as a whole.

Together we have a key part in helping farmers hold down production costs. Food prices have risen, it's true, but they would have been infinitely higher without the contribution of agricultural science.

The fact that the average consumer today spends a smaller percentage of his take-home pay on food than he did in the 1920's is a clear indication that food is the best bargain on today's market.

The public is prone to ignore scientific advances and to think of farming only in terms of the hoe, the milk pail, and the kerosene lantern. Look at the progress scientific research has provided the broiler grower. A scant eight years ago it took 4 pounds of feed to produce a pound of poultry meat. Today, growers can produce a pound of broiler meat on 2 pounds of feed. Eight years ago it required 12 weeks to grow a marketable bird; today it can be done in 8 weeks.

But for the advances through scientific research, the housewife would be paying considerably more for broiler chickens instead of the 35 to 40 cents she actually pays. The same goes for almost any other food item.

This is the vital, the dramatic story we have to tell. We must tell the consumer everywhere the true facts about agriculture and what we are doing through research to keep the industry in a healthy state.

Here arises the need for a catch phrase. A number of them have been suggested, but I wonder if we might not use "The Age of Agri-dynamics" as a proper tag for this era of scientific farming.

In your industry the Agri-dynamics Age could mean the continuing search for new knowledge about decomposition of food, about new methods of sterilization, preservation and packaging.

In my field, Agri-dynamics could connote the endless drive toward helping the farmer produce more and better livestock and poultry more economically.

In educating the public, I believe we will go a long way by using a term like Agri-dynamics to emphasize that progress in agriculture is every bit as dramatic as that in electronics or nuclear energy.

Research is dressing agriculture in glamorous new garb. Let's tell the world about it.

Research on Foods—from the Field to the Consumer

By Dr. Emil Mrak, Head, Department of Food Technology, University of California

It is flattering to be invited to speak to this group, especially since much of what I have to say will be concerned with the research program that has been evolving during the past few years, in the Department of Food Technology at Davis. While it is with great enthusiasm that I speak on this subject, I can assure you it is also with great humility, for the program which has been receiving favorable comments has resulted from a combination of effort involving a number of people, university departments and organizations. Before discussing food research from the field to the consumer, however, I should like to dwell a little on the history of canning research in the United States to help establish the value of the "full spectrum program" I plan to discuss.

Defensive Research in Past

A study of the development of food research in the United States reveals that much of the canning research has been and still is defensive in nature. For example, about 60 years ago Dean Prescott was called upon to solve spoilage problems in connection with canned sea foods and corn. About the same time Dean Russell in Wisconsin began to study problems relating to the spoilage of canned peas. Later chemists were brought in to study intensively can corrosion, and bacteriologists to solve the very serious botulinum problem. Extensive nutritional studies were made later in order to establish the reliability of canned foods. It is my understanding that even the National Canners Association was founded in part as a defensive measure to meet problems posed by the new Food and Drug Law that had been pushed so ardently by Dr. Wiley.

In looking over these research programs we see very little that goes beyond the solution of immediate problems. On the other hand, little consideration has been given to the immediate future and practically none to the distant future. Certainly there has been little if any "shooting at stars," which I know is occurring in other industries. The development of food research in the canning industry, therefore, has been the result of immediate necessity rather than planning.

Food research in the Agricultural Experiment Station also grew up in a rather accidental manner. Most research activity, however, related to commodities of interest to the areas in which Experiment Stations were located. For example, emphasis was placed on the processing of dried fruits, cereal products, dairy products, poultry products, etc., according to the location of the station. On the other hand, in certain cases emphasis was placed on the process such as canning, drying, freezing, or pickling.

Integrated Research Needed

The development of a complete program considering all factors influencing the processed food from its production on the farm to its consumption has not been apparent until very recently. As a matter of fact, I still hear it said that "food research starts at the time the product is delivered to the cannery." It is difficult to understand how such thinking ever started. If raw materials are not foods before delivery to the cannery, what are they —cow fodder? Are these people, who would undoubtedly select carefully for fresh consumption, willing to ignore factors influencing raw materials until they arrive at the plant? Perhaps in the past, but not today. Food research actually should start on the farm from the time the seed or tree is planted, the egg laid, or the animal born. It has been said by some that "if present problems were solved the industry would get along," that "applied research is all that counts," and even "forget the consumer, for advertising will take care of him no matter what the quality of the food may be."

These situations may have been true in the past but times have changed. In my opinion, if the processor does not realize the situation at hand, he very well may be in trouble. Nevertheless, there still remains a historical pressure favoring islands of research rather than a complete archipelago of research. The pressure still remains for work on restricted problems of obvious and immediate importance. There is little effort to challenge common and accepted procedures with respect to quality and quantity. In my travels about the country I have noted a defeatist attitude with respect to certain obvious problems in the food industry. There is a lack of imagination and understanding of the broadness of the problem. Narrow reasoning is so deeply imbedded that it is manifested even in the editorial policies of some of the well established food journals. If the food industry, and particularly the canning industry, is to advance and maintain its position of advancement alongside other industries, this attitude must change.

If a segmented type of research program fails to fill the needs with respect to quality and yield, then what type of program would? During the past few years we at Davis have been talking about a full spectrum approach to food research. There must be fundamental as well as applied work. The work must be carried on with all phases of industry including those interested in agricultural production as well as those concerned with processing, storage, distribution and marketing. All aspects of the food must be considered from the time it is produced on the farm until the time it is used by the consumer. As a result of this type of reasoning we believe a profitable research program dealing with certain canned fruits has been developed. I should like to tell you a little about this program and the results obtained.

Ingredients of a Full Program

In this program raw materials are given first consideration. Variation in raw materials may be responsible for success or failure of a processing operation. Consideration, therefore, must be given to cultural practices, including soil treatment, irrigation,

spray programs, use of agricultural chemicals, etc. Especially important are the time of harvest and changes that may occur during transportation, storing and handling the fresh produce just before processing.

Naturally, processing, including formulation, is also important. It is needless to dwell at this point on the influence of processing variables. In our opinion, however, research needs to include more than raw materials and processing. Changes may occur during storage of the canned product so these must be taken into consideration.

Handling and distribution procedures must also be evaluated. The USDA Western Utilization Research Laboratory has certainly shown this to be the case for frozen foods. The best product in the world may be ruined by improper handling on the part of the distributor. Finally, consumer acceptance is all important. The factors of flavor, color and texture all must be considered from the standpoint of the consumer. The factor of stability enters into this, for if a product decreases in quality during handling or storage after purchase it may well affect consumer acceptance. The convenience factor including the type of packaging must not be overlooked, nor must those of aesthetics and sanitation. Naturally, the product must be safe, for if it makes a person ill he will not be likely to purchase it again. And certainly, nutritive values must be kept in sight throughout any broad spectrum program.

Pear Program an Example

Let's consider a few examples based on our own experience. One of our earliest programs resulted from the irregular quality of canned pears. This fruit, of course, has been canned in California and other states for many years and it was presumed that processors knew all there was to be known about pears. This was not the case, however, for a complete study of all factors from production to consumption has not been made. In the pear study conducted at Davis, cultural factors including variety, area of production, nitrogen fertilizer, hormone sprays, etc. have been investigated. The factor of time of harvest has proven to be of particular importance. Studies on hauling procedures, particularly bulk handling, have been under way. We have done a good deal of work on the influence of post-harvest storage and treatment and the sweetness factor, particularly sugar-acid ratio, on eating quality. Difference and consumer tests have been made and we are now studying the influence of processing variables and storage conditions on the eating quality of the canned product. Finally, an intensive study has been made of chemical changes occurring in the fruit as a result of all the variables indicated above. These have included sugars, acids, pectic substances, vitamins, volatile reducing substances, etc. Drained weight changes were followed every day for 30 days and then at greater intervals for a year.

In the past, pears were harvested when hard and green and little attention was given to harvest maturity. In many instances pears in the same box differed greatly in pressure test, which of course resulted in an irregular ripeness at the time of canning. It is needless to say what this meant in terms of cannery operation. We have found that it is highly advantageous for pears to be harvested at a pressure range of 16 to 21 pounds. In actual practice it is necessary to go through the orchard and test the fruit for size and pressure test. When

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enough pears have reached the minimum acceptable size and the pressure test of 21 pounds or lower, the first harvest can be made. If growers follow this procedure throughout the season, it is possible for them to deliver fruit of uniform maturity to the canneries. With adequate training programs and education of fieldmen, it is possible for processors to secure fruit in this manner.

Our results have shown that freshly harvested pears should be placed immediately in cold storage at 29½ to 31° F. Our observations indicate that it is best to precool the fruit until the core temperature is the same as the storage temperature. Furthermore, it is essential for proper flavor development and ripening, to cold store the fruit for a minimum period of 7 days. When the fruits are cooled at a core temperature of 31° F. the ripening process practically stops. This procedure has proven to be highly advantageous because in the subsequent ripening process in controlled ripening rooms it is important that all fruit enter these rooms at the same temperature. We now know that properly precooled fruits held in cold storage for 7 days will enter the ripening room at a uniform temperature. This is proving to be a very important point in the canning of pears.

As indicated above, after holding in cold storage, the pears are ripened in controlled ripening rooms operating at 68° F. and about 90 percent relative humidity. Under these conditions the fruit is ripened to an average pressure test of about 2 pounds. In the past, most processors in California were in the habit of ripening their fruit at ambient temperatures which vary widely in different locations, at different times of the year, and in different years. Without controlled ripening at the desirable temperature and humidity, inconsistent results certainly occurred commonly, for it is impossible to control the rate of ripening of fruit under these conditions. With rigidly controlled harvest procedures, and the proper time in cold storage it is possible to uniformly ripen pears at 68° F. and 90 percent relative humidity. If pears are placed in a room that had been previously used for ripening pears, the ripening process takes place in 5 to 6 days. All this, of course, depends on the pressure reading at the time of harvest, proper control after harvesting, and adequate ripening facilities.

Studies Already Paying Off

Now, what have all these studies meant to industry? First of all, it has been shown that by rigidly following these procedures the maximum dessert quality and maximum canning character can be obtained. It has also been shown that by following the procedures outlined above a practical materials handing program can be developed and followed, thereby greatly reducing direct labor costs and facilitating a regularized processing operation. These facts, of course, have contributed markedly to the tremendous reduction in direct labor costs to the California industry. In addition, it has been possible to reduce tremendously the loss of overripe or underripe pears. By rigidly following these procedures, as much as 17 to 22 percent increase in case yield can be achieved. These figures have been confirmed several years in a row by commercial canning organizations who have been following the recommended procedures. Furthermore, one canner has indicated, as a result of this program he is selling his pears at a maximum price and has been experiencing a 10 percent increase in sales. Furthermore, he is presently selling pears in markets previously unavailable to him because of "inconsistency in quality."

It would be unfair to discuss the work mentioned above without some reference to the cooperative research planning and effort that went into the program. The project was initiated in 1952 through the collaborative plan-

ning of Sherman Leonard of the Food Technology Department and Dr. L. L. Claypool of the Department of Pomology. It was the first time we had a real opportunity to work closely with a production department and actually attempt to translate some of their observations into the improvement of quality of the canned product. After a year of experimental probing it was quite obvious that much was to be gained from a program. However, further advice and support was needed. The program was discussed with the canners of California, the National Canners Association, pear growers, and container and sugar manufacturers. A general program was outlined with the result that canners, growers and the sugar people supported it. The various agencies have been kept informed and leaned on for counsel and advice in order to take advantage of their wisdom and experience. We are strongly of the opinion that the positive results obtained in this program would not have been possible had it not been an integrated industry and university effort and if we had not considered all aspects of the problem from the farm to the consumer.

Freestone Peach Studies

An extensive program on freestone peaches under way for only two years has already yielded some very surprising and worthwhile results. Because of the relationship established with the canners, the National Canners Association and others while working on pears, we were asked by the industry to work on factors influencing the drained weight, quality, etc., of canned freestone peaches. This work was done at Davis in collaboration with the Department of Pomology, the National Canners Association, the canners, the can and sugar manufacturers, growers, and others. There have been frequent discussions relating to the program and results obtained. As a matter of fact, last year a "no publicity" meeting was held with the canners in order to discuss the results of the first year's work.

In this case we have measured the effect of variety, location and cultural practices on the quality and cut-out yield of the fruit. We have also measured the influence of fertilizing at two nitrogen levels and certain miticide sprays on the acceptance of the canned product.

The factors of harvest maturity and subsequent handling, ripening and handling of the raw material just before storage were studied very intensively. Extensive packs were made enabling comparison of the normal industry procedure with experimental packs involving 80 variables. Of particular interest were packs involving variations in raw materials; particularly with respect to time of harvest and controlled ripening.

Processing factors studied were peeling losses, fill weight, effect of sugar concentration, sugar-acid ratio, process time, type of exhaust, type of process, size as related to sugar adjustment, etc. These varibles had a tremendous effect, not only on canning quality, but also on eating quality. We were surprised to find that fruit harvested in the green and yellow stages at pressure tests of 27 and 12 pounds, when ripened under controlled conditions, gave a superior canned product with better flavor and color. Green and yellow peaches ripened under controlled conditions in 8 days. We know it is now possible to harvest freestone peaches at a maturity range of 27 to 12 pounds pressure and ripen them uniformly to a 2 pounds pressure test in 8 days without loss.

When completed, this work will establish a basis for the formulation of drained weight standards. It will also result in a consistency of quality that we have never before been able to obtain in California. Finally, it will result in a great decrease in wastage resulting from bruising and deterioration that occurs when fully mature fruit is harvested in the orchard. It should minimize the loss of fruit from dropping to the ground prior to and during harvesting. It should minimize losses from bruising occurring during harvesting and handling at the plant. Most certainly it will result in a great increase in case yield; just how much is now impossible to estimate. Finally, it will result in a consistent flow of materials through the plant and, as in the case of pears, a decrease in cost of operation. These factors all seem so obvious to us now, but until the over-all collaborative effort was started they apparently weren't realized.

Cling Peaches Also

Our program on canned cling peaches has been extensive and also covered the complete area from cultural practices to consumer. For some reason, however, industry seems to have had less interest in this work than in other fruits. This program has involved the influence of nitrogen fertilizers, agricultural chemicals and hormones on the canning qualities of fruit. It has also included attention to harvest maturity, ripeness for canning, and processing characteristics. The control of post-harvest physiology is still being studied since the cling peach cannot be ripened under the controlled conditions used for freestone peaches and pears.

Bulk handling studies were started in 1954 but because of limited interest on the part of industry they have been progressing at a slow pace. Last summer, however, this part of the program was greatly expanded through the collaboration of one canner and one grower. Peaches can be handled from orchards to the cannery in bulk, but considerable work remains to be done before a reliable procedure can be worked out. Microbiological and physiological changes must be considered and controlled to a reasonable extent. Last summer rather extensive packs were made and these will soon be evaluated by use of chemical and acceptance tests. Processing studies, especially as pertains to peeling, have resulted in an increase in case yield.

It is possible to increase the flavor and consumer acceptance of canned cling peaches by proper selection and control of raw materials and by maintaining a desirable sweetness-acid ratio. During the past few years very large packs were made for the purpose of studying consumer reaction to experimental samples of cling peaches. It is evident that the sweetness-acid ratio factor is important and of value in maintaining uniform eating quality. Presently there is under way a consumer acceptance study with a large marketing organization. The results of this work will be compared with panel testing, State Fair testing, and consumer tests made in California. Studies on the influence of storage conditions for the canned product on eating quality and nutritive value are also in progress.

Truly, this is a case where all aspects of the total problem from the farm to the consumer have been considered. Some of the work has resulted in an increase in case yield, and there is substantial evidence to indicate that flavor quality can be maintained at a higher and more uniform level.

Tomato Program

We have another extensive program on tomatoes, involving collaboration with all agencies interested in this commodity. Studies include influence of variety, cultural practices, maturity, bulk handling, storage processing variables, and consumer acceptance. Thus far there are definite indications that color, solids, chemical composition, storage characteristics of the fresh product, nutritive value, consistency and flavor are influenced by fertilizer practice and time of harvest.

Perhaps of more immediate interest to canners are the processing studies concerned with methods of heating the raw product. Since our pilot plant is equipped with steam injection, Califactor, flash evaporator, thermonuter, thermopulper and the new Creamery Package rotary heating equipment, it has been possible to make some interesting comparisons. A number of other variables are also under observation but time does not permit even the listing of them. It is needless to say that this expanding program has been and will be carried on in close collaboration with the production department, tomato growers, canners, National Canners Association, can manufacturers and the Glass Container Manufacturers Institute. It appears that this program will do

much to improve quality, case yield and consumer acceptance of tomato products as a result of improvement and more effective handling of raw materials, improved processing and a better understanding of storage deterioration.

Final Observations

The programs briefly described above have been possible only because of the full spectrum of approach wherein all factors are considered from growing clear through to consumption. Every phase in the history of the food must be considered from the standpoint of its relation to other phases and finally to the consumer of the product. The program must bring together many points of view: those of the grower, fieldman, fresh product man, processor, storage man, and jobber. In an experiment station such as that at Davis the food technologist must work closely with the production people as well as with the grower, canner, trade association, and container, sugar, and equipment manufacturers.

We have found that frequent discussions with these groups have not only been helpful to us but have helped to maintain the interest of these groups in our work. Our program in California is now getting into high gear. We are closer to the canning industry than ever before. The importance of a full spectrum program, particularly with respect to raw materials, has become apparent. The Agricultural Extension Service has assigned a specialist to the Department of Food Technology to work in the area of raw materials for processing because of the realization that quality and yield of the processed product are so very dependent on raw materials selection. Both the producer and canner need information in this area and we at California will try to obtain it and it a variable.

In closing this discussion, I want to reemphasize the importance of considering all factors from raw material production and handling to processing, storage, distribution and consumption, for if we keep on thinking in terms of isolated problems and only those concerned with an immediate emergency, the outlook for the future can only be for a static rather than an advancing and dynamic industry.

N.C.A. Research Laboratories Exhibit in Convention Hall

The N.C.A. Research Laboratories this year manned a booth at Convention Hall throughout the Convention. On a few previous occasions, the Laboratories have staged special exhibits of equipment, one of these being the mobile trailer laboratory which attracted great interest. At other Conventions the Laboratory personnel have been available for consultation at N.C.A. staff offices, but this is the first time that consultation and displays have been combined in a booth among the equipment and supply exhibits.

Three kinds of displays were used: pictures and charts illustrating typical research and service activities of the Laboratories; a display of reports, bulletins, and information material available to canners and others; and finally, various pieces of laboratory equipment typical of those used in the important functions of the Laboratories.

A large "pie" chart showed the division of Laboratory working time into research and service activities, each identified in enough detail to carry its message to the reader. These were further illustrated on separate display posters, describing such things as process determination, spoilage prevention, waste disposal, sanitation, and quality control. A final panel displayed samples of Laboratory publications, including those on nutritive values of canned foods. Request cards for the latter were made available, and a good many requests were made.

Laboratory activities were illustrated more concretely by displays and demonstration of equipment actually used, for example, in determining rates of heat penetration, testing cans for microleakage, fly bioassay of insecticide residues and instructing factory technicians in microscopic methods of quality control.

Staff members from the Berkeley, Seattle, and Washington Research Laboratories were in attendance at all times for consultation or arrangement of appointments with others.

ning of Sherman Leonard of the Food Technology Department and Dr. L. L. Claypool of the Department of Pomology. It was the first time we had a real opportunity to work closely with a production department and actually attempt to translate some of their observations into the improvement of quality of the canned product. After a year of experimental probing it was quite obvious that much was to be gained from a program. However, further advice and support was needed. The program was discussed with the canners of California, the National Canners Association, pear growers, and container and sugar manufacturers. A general program was outlined with the result that canners, growers and the sugar people supported it. The various agencies have been kept informed and leaned on for counsel and advice in order to take advantage of their wisdom and experience. We are strongly of the opinion that the positive results obtained in this program would not have been possible had it not been an integrated industry and university effort and if we had not considered all aspects of the problem from the farm to the consumer.

Freestone Peach Studies

An extensive program on freestone peaches under way for only two years has already yielded some very surprising and worthwhile results. Because of the relationship established with the canners, the National Canners Association and others while working on pears, we were asked by the industry to work on factors influencing the drained weight, quality, etc., of canned freestone peaches. This work was done at Davis in collaboration with the Department of Pomology, the National Canners Association, the canners, the can and sugar manufacturers, growers, and others. There have been frequent discussions relating to the program and results obtained. As a matter of fact, last year a "no publicity" meeting was held with the canners in order to discuss the results of the first year's work.

In this case we have measured the effect of variety, location and cultural practices on the quality and cut-out yield of the fruit. We have also measured the influence of fertilizing at two nitrogen levels and certain miticide sprays on the acceptance of the canned product.

The factors of harvest maturity and subsequent handling, ripening and handling of the raw material just before storage were studied very intensively. Extensive packs were made enabling comparison of the normal industry procedure with experimental packs involving 80 variables. Of particular interest were packs involving variations in raw materials; particularly with respect to time of harvest and controlled ripening.

Processing factors studied were peeling losses, fill weight, effect of sugar concentration, sugar-acid ratio, process time, type of exhaust, type of process, size as related to sugar adjustment, etc. These varibles had a tremendous effect, not only on canning quality, but also on eating quality. We were surprised to find that fruit harvested in the green and yellow stages at pressure tests of 27 and 12 pounds, when ripened under controlled conditions, gave a superior canned product with better flavor and color. Green and yellow peaches ripened under controlled conditions in 8 days. We know it is now possible to harvest freestone peaches at a maturity range of 27 to 12 pounds pressure and ripen them uniformly to a 2 pounds pressure test in 8 days without loss.

When completed, this work will establish a basis for the formulation of drained weight standards. It will also result in a consistency of quality that we have never before been able to obtain in California. Finally, it will result in a great decrease in wastage resulting from bruising and deterioration that occurs when fully mature fruit is harvested in the orchard. It should minimize the loss of fruit from dropping to the ground prior to and during harvesting. It should minimize losses from bruising occurring during harvesting and handling at the plant. Most certainly it will result in a great increase in case yield; just how much is now impossible to estimate. Finally, it will result in a consistent flow of materials through the plant and, as in the case of pears, a decrease in cost of operation. These factors all seem so obvious to us now, but until the over-all collaborative effort was started they apparently weren't realized.

Cling Peaches Also

Our program on canned cling peaches has been extensive and also covered the complete area from cultural practices to consumer. For some reason, however, industry seems to have had less interest in this work than in other fruits. This program has involved the influence of nitrogen fertilizers, agricultural chemicals and hormones on the canning qualities of fruit. It has also included attention to harvest maturity, ripeness for canning, and processing characteristics. The control of post-harvest physiology is still being studied since the cling peach cannot be ripened under the controlled conditions used for freestone peaches and pears.

Bulk handling studies were started in 1954 but because of limited interest on the part of industry they have been progressing at a slow pace. Last summer, however, this part of the program was greatly expanded through the collaboration of one canner and one grower. Peaches can be handled from orchards to the cannery in bulk, but considerable work remains to be done before a reliable procedure can be worked out. Microbiological and physiological changes must be considered and controlled to a reasonable extent. Last summer rather extensive packs were made and these will soon be evaluated by use of chemical and acceptance tests. Processing studies, especially as pertains to peeling, have resulted in an increase in case yield.

It is possible to increase the flavor and consumer acceptance of canned cling peaches by proper selection and control of raw materials and by maintaining a desirable sweetness-acid ratio. During the past few years very large packs were made for the purpose of studying consumer reaction to experimental samples of cling peaches. It is evident that the sweetness-acid ratio factor is important and of value in maintaining uniform eating quality. Presently there is under way a consumer acceptance study with a large marketing organization. The results of this work will be compared with panel testing, State Fair testing, and consumer tests made in California. Studies on the influence of storage conditions for the canned product on eating quality and nutritive value are also in progress.

Truly, this is a case where all aspects of the total problem from the farm to the consumer have been considered. Some of the work has resulted in an increase in case yield, and there is substantial evidence to indicate that flavor quality can be maintained at a higher and more uniform level.

Tomato Program

We have another extensive program on tomatoes, involving collaboration with all agencies interested in this commodity. Studies include influence of variety, cultural practices, maturity, bulk handling, storage processing variables, and consumer acceptance. Thus far there are definite indications that color, solids, chemical composition, storage characteristics of the fresh product, nutritive value, consistency and flavor are influenced by fertilizer practice and time of harvest.

Perhaps of more immediate interest to canners are the processing studies concerned with methods of heating the raw product. Since our pilot plant is equipped with steam injection, Califactor, flash evaporator, thermonuter, thermopulper and the new Creamery Package rotary heating equipment, it has been possible to make some interesting comparisons. A number of other variables are also under observation but time does not permit even the listing of them. It is needless to say that this expanding program has been and will be carried on in close collaboration with the production department, tomato growers, canners, National Canners Association, can manufacturers and the Glass Container Manufacturers Institute. It appears that this program will do

much to improve quality, case yield and consumer acceptance of tomato products as a result of improvement and more effective handling of raw materials, improved processing and a better understanding of storage deterioration.

Final Observations

The programs briefly described above have been possible only because of the full spectrum of approach wherein all factors are considered from growing clear through to consumption. Every phase in the history of the food must be considered from the standpoint of its relation to other phases and finally to the consumer of the product. The program must bring together many points of view: those of the grower, fieldman, fresh product man, processor, storage man, and jobber. In an experiment station such as that at Davis the food technologist must work closely with the production people as well as with the grower, canner, trade association, and container, sugar, and equipment manufacturers.

We have found that frequent discussions with these groups have not only been helpful to us but have helped to maintain the interest of these groups in our work. Our program in California is now getting into high gear. We are closer to the canning industry than ever before. The importance of a full spectrum program, particularly with respect to raw materials, has become apparent. The Agricultural Extension Service has assigned a specialist to the Department of Food Technology to work in the area of raw materials for processing because of the realization that quality and yield of the processed product are so very dependent on raw materials selection. Both the producer and canner need information in this area and we at California will try to obtain it and it a variable.

In closing this discussion, I want to reemphasize the importance of considering all factors from raw material production and handling to processing, storage, distribution and consumption, for if we keep on thinking in terms of isolated problems and only those concerned with an immediate emergency, the outlook for the future can only be for a static rather than an advancing and dynamic industry.

N.C.A. Research Laboratories Exhibit in Convention Hall

The N.C.A. Research Laboratories this year manned a booth at Convention Hall throughout the Convention. On a few previous occasions, the Laboratories have staged special exhibits of equipment, one of these being the mobile trailer laboratory which attracted great interest. At other Conventions the Laboratory personnel have been available for consultation at N.C.A. staff offices, but this is the first time that consultation and displays have been combined in a booth among the equipment and supply exhibits.

Three kinds of displays were used: pictures and charts illustrating typical research and service activities of the Laboratories; a display of reports, bulletins, and information material available to canners and others; and finally, various pieces of laboratory equipment typical of those used in the important functions of the Laboratories.

A large "pie" chart showed the division of Laboratory working time into research and service activities, each identified in enough detail to carry its message to the reader. These were further illustrated on separate display posters, describing such things as process determination, spoilage prevention, waste disposal, sanitation, and quality control. A final panel displayed samples of Laboratory publications, including those on nutritive values of canned foods. Request cards for the latter were made available, and a good many requests were made.

Laboratory activities were illustrated more concretely by displays and demonstration of equipment actually used, for example, in determining rates of heat penetration, testing cans for microleakage, fly bioassay of insecticide residues and instructing factory technicians in microscopic methods of quality control.

Staff members from the Berkeley, Seattle, and Washington Research Laboratories were in attendance at all times for consultation or arrangement of appointments with others.

New Objective Techniques for MEASURING QUALITY FACTORS

(jointly sponsored by N.C.A. and C.M.&S.A.)

PRESIDING: GERALD G. MOYER, Minneapolis-Honeywell Regulator Co., Philadelphia

ADDRESS: "The Potential of Color Measurement in Quality Control"—Dr. AMIHUD KRAMER, Department of Horticulture, University of Maryland, College Park

ADDRESS: "Vapor-Phase Chromatography"—Dr. IRVING FAGERSON, Department of Food Technology, University of Massachusetts, Amherst

ADDRESS: "Infrared Spectroscopy"—Dr. ABRAHAM SAVITSKY, Research Engineer, Perkin-Elmer Corporation, Norwalk, Conn.

The Potential of Color Measurement in Quality Control

By Amihud Kramer, University of Maryland

Recent advances in the physics and engineering of color measurements have adequately solved the problem of color measurement of foods. This is especially true when color measurement is not complicated by the presence of other appearance factors such as gloss, mottling, and texture. It is now possible to measure the color of foods as well as other items precisely in terms of internationally accepted units. These methods, however, involve rather expensive and elaborate instruments and/or a considerable amount of calculation before the color specifications of the test item may be established.

Furthermore, the specification of the color does not in itself indicate consumer preference for an item. Thus, for the practical application of color measurements for use in quality control, there remain two fruitful areas of research, work on which is still in the beginning stage.

These two areas of research are (a) correlation of color specifications to consumer preference, or other specific problems involved, and (b) development of the simplest instrumentation covering only the color dimensions involved in the specific problem, for a specific product.

COLOR—A PROBLEM IN PHYSICS AND PSYCHOLOGY

Physically, color is a characteristic of light, measurable in terms of intensity (radiant energy), and wave lengths. It arises from the presence of light in greater intensities at some wave lengths than at others. Psychologically, it is further limited to the band of the spectrum from 380 to 770 millimicrons (mμ) (1 mμ=10 Angstrom units=.00001 millimeter), since the human is practically insensible to other sources of radiant energy. Thus the phenomenon of color is said to be psychophysical, and is defined as consisting of the characteristics of light, light being that aspect of radiant energy of which a human observer is aware through the visual sensations which arise from the stimulation of the retina of the eye.

LIGHT SOURCE

Color perception is further limited by the light source. Obviously, no color may be detected by the eye, or by an instrument in the dark, that is, in the absence of a light source emitting radiant energy in the visual range of the spectrum. A common experience is to purchase some item in a dimly lighted store, only to find that the color of the item is substantially different when viewed in broad daylight. Visual inspection of food items has occasionally been erroneous because the light source did not emit sufficient radiant energy at the critical wave lengths. Thus, three standard illuminants have been established by the International Commission of Illumination: These are:

Illuminant A—incandescent lamp (2,854 degrees K)

Illuminant B—noon sunlight (5,000 degrees K)

Illuminant C—cloudy daylight, or north light (6,800 degrees K) (K refers to degrees Kelvin)

Another illustration of the importance of the light source is the existence of metameric pairs. This refers to a pair of objects which may appear to have the same color when irradiated at certain wave lengths, but to possess distinctly different colors when viewed under a light consisting of different wave lengths.

REFLECTION OF LIGHT

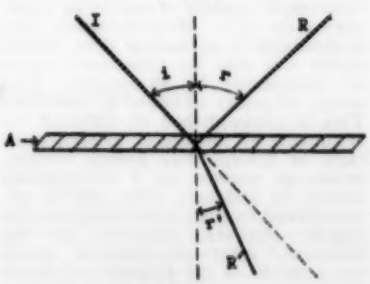
Light may be reflected, transmitted, absorbed, or refracted. Reflected light refers to that part of the radiant energy emitted by the light source which bounces back from the surface of the illuminated object. Transmitted light passes through the object, while the light which is refracted is also transmitted, but the angle of transmission (emergence) is different from the angle of incidence (entrance) (Figure I).

When practically all radiant energy in the visible spectrum is reflected from an opaque surface, the color of the object appears to be white. If it is partially absorbed but more or less to an equal extent across the entire visible spectrum, the color impression is that of a gray substance. If the absorption is practically complete the resultant impression is that of a black material.

This over-all relation of reflection to absorption without regard to specific wave lengths, is termed psychologically lightness, or value. If, however, radiant energy is absorbed at some wave length to a greater extent than the other wave lengths, the human observer sees what he popularly thinks of as color, and what is more accurately referred to physically as dominant wave lengths, or psychologically as hue.

Thus, if the shorter wave lengths of 400 to 500 millimicrons are reflected to a greater extent than the other

Figure I



I - Incident beam
R - Reflected light
R' - Refracted light
A - Absorption area

i - Angle of incidence
r - Angle of reflection
r' - Angle of refraction

wave lengths, the color is described as blue. Maximum reflection in the medium range results in a green or yellow impression, while greater reflection at the longer wave lengths of 600 and 700 millimicrons indicate red objects (Figure II).

The amount of reflection of light at a given wave length is a third important attribute of color, which in physical terms is called purity, and in psychological terms has been referred to variously as intensity, strength or chroma.

Specular and Diffuse Reflectance

When light is reflected from a surface evenly at all angles, the impression on the observer is that the product has a flat, or dull, finish. This is termed diffuse reflectance, as contrasted with specular or directional reflectance, when light is reflected more strongly at a specific angle, or in a beam, as by a mirror which is frequently but not always, at a 45-degree angle from the incidence of the light. This directional reflectance gives rise to gloss, or sheen, of some materials (Figure III).

Some of these physical and psychological terms used to denote different color attributes are summarized below:

Physical
- Radiant energy
- Reflectance
- Dominant wave length
- Purity
- Directional reflectance

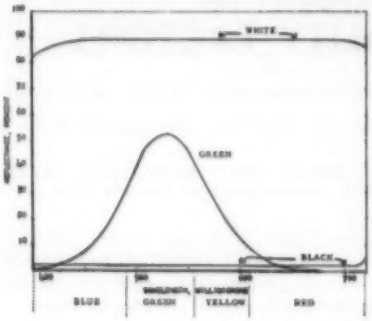
Psychological
- Light
- Lightness, value
- Hue, color
- Chroma, intensity, strength
- Gloss, sheen

Spectrophotometry

The color of any object may be defined comprehensively by measuring the amount of reflection of light from the surface of the object at each wave length in the visible range of approximately 380 to 770 millimicrons. This determination may be made by the use of a spectrophotometer, which is an instrument capable of providing monochromatic light. Monochromatic light is obtained by spreading light (white light) out into its component colors or wavebands by dispersion. This array of colors is called a spectrum. This is accomplished in different instruments by the use of prisms, gratings, or filters. For precise results, bands as narrow as 5 millimicrons should be isolated. This can be accomplished in such instruments as the Hardy (General Electric) or the Beckman spectrophotometers which use a prism or the Bausch and Lomb Spectronic 20 which uses a grating for isolating the spectral bands. Most filter instruments are capable of selecting a less pure wave length band of about 30 millimicrons, but are much more economical.

This monochromatic light is then directed at the sample, and the light

Figure II



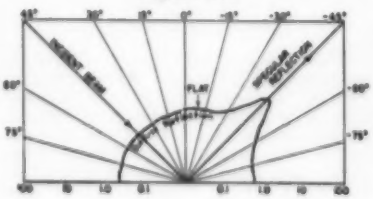
reflected from the sample activates one or more photo-sensitive cells which transfer radiant energy to electrical energy, which is then indicated on some form of a millivoltmeter. If the instrument is a recording spectrophotometer, as the General Electric Spectrophotometer, the wave length is changed automatically, and percent reflectance is recorded continuously for each wave length, until a complete curve of reflection across the entire visible range of wave lengths is obtained. The spectrophotometric curve of reflection characterizes the color of the product. However, in order to transform these data into more meaningful values additional calculations are needed.

Tristimulus Colorimetry and the Standard Observer

The discussion above indicated that color is three-dimensional. That this is a psychological as well as a physical fact has been well established, since it was found that normal color vision is three-dimensional. It thus follows that any color may be described by three numbers, and that a spectrophotometric curve may be reduced to three numbers, which would adequately and accurately describe the color of any substance.

The standard system, against which other systems should be compared, is the one recommended by the International Committee on Illumination and which is based on the "standard observer." This is an imaginary standard eye, consisting of three primary color filters having exactly specified spectrophotometric curves x, y, and z; with x being essentially amber in color; y, green, and z, blue.

Figure III



Any spectrophotometric curve of reflectance obtained from the surface of an object can then be integrated in terms of x, y, and z.

When using a Hardy recording spectrophotometer, these x, y, and z values may be obtained automatically, by the use of an integrator especially designed for this purpose.

These x and y values are also known as the chromaticity coordinates which may be plotted on a chromaticity diagram (Figure IV) and the color of the test object may thus be identified.

Methods of Measurement

Spectrophotometric: Where a complete color definition is required, there are in existence a number of instruments besides the Hardy (GE) spectrophotometer, capable of providing spectrophotometric curves rapidly and automatically. The American Optical Scanning Spectrophotometer provides instantaneous curves of reflection or transmission (5). The Rephobiospect (1) developed by Norris et al. charts transmission curves even for such solid foods as tomatoes and apples.

Tristimulus colorimeters: Complete color specifications may be obtained with tristimulus colorimeters such as the Hunter color and color difference meter and Photovolt Reflection Meter (3). Such filter instruments also provide color data in three dimensions with a minimum of manual manipulation.

Abridged methods: In applying color measurements to food quality control, it may not be necessary to provide a complete identification of color in color space, which would of necessity be solved only by the integration of a spectrophotometric curve, or more simply as a three dimensional measurement. Thus for example, it has been demonstrated that tomato juice color as viewed by the consumer is only a two-dimensional problem, so that color quality in this instance may be measured as a hue ratio of red/yellow. With lima beans, lightness is the critical dimension so that for this product, all that needs to be done is to measure the degree of reflectance as a single value(4).

Problems of Measurement

By their very nature, food products present a number of difficult problems, particularly when the food is to be presented to a scanning device on a continuous flow basis.

Opacity: Opaque materials, such as most solid foods, reflect much more light than they transmit, so that their measurement is ordinarily limited to measures of reflection rather than transmission.

Uniformity of units: Individual units of a food product may exhibit substantial variations in color. A single apple for example, may be red on one side, and green on the other side.

Geometric pattern: The same apple may be large, or small, have a deep or shallow cavity, may be round, oval, or pear shaped.

Possible Applications

Color measurements may be used directly to control or sort material for color, or indirectly, to control other factors of quality which are correlated with certain color phenomena.

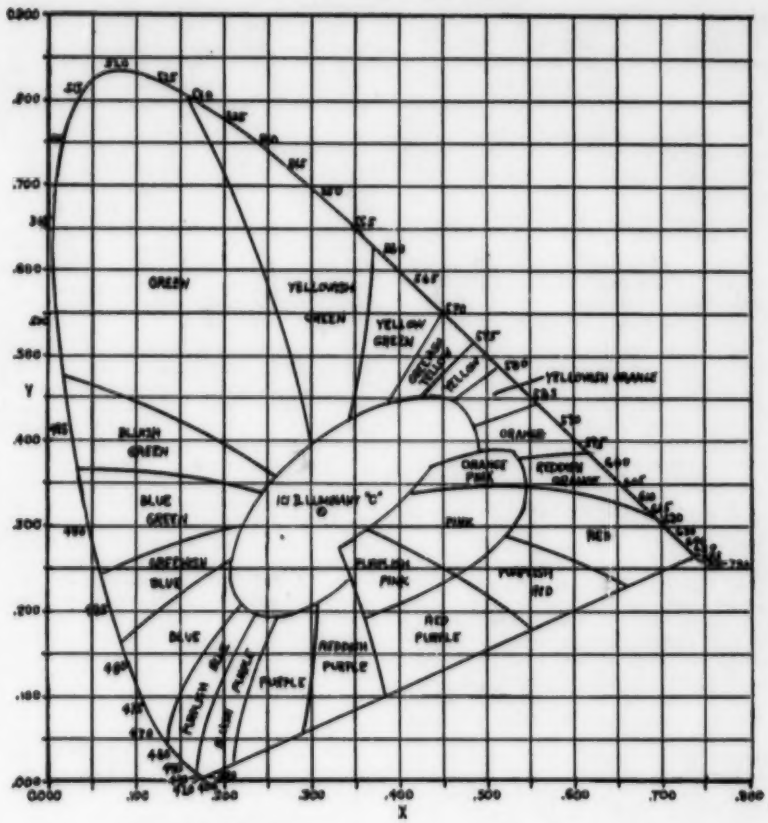
Direct color control: With the exception of applications to beans, eggs and lemons, the above principles have not been applied commercially to the color control and sorting of foods, perhaps because of difficulties of presenting the material for scanning. The above applications overcame these difficulties by positioning and testing each unit singly on a go-no go basis. Particularly for fluid materials, however, it should be possible to control color within narrow limits on a continuous basis. Why, for example, could not the color of tomato juice be controlled by the proper manipulation of photometrically activated valves controlling the flow of different batches into a mixing tank? Where dyes are added to provide a certain color, the problem would be even less difficult. In the case of sorting operations, undesirably colored units could be removed by photometric means not only from beans and eggs, but from many, many other food products. Further development of the Rephobiospect (1) may make it possible to sort materials such as whole tomatoes or peaches on the basis of internal flesh color.

Correlated Factors: Many agricultural products show color changes as they mature or ripen. Yellow sweet corn, for example, becomes increasingly more yellow-orange as it matures. Thus the very important factor of maturity in this commodity could be controlled by sorting automatically on the basis of the yellowness of the ears. Since whole kernel corn should consist of less mature material than cream style corn, the less yellow ears could be directed to the whole kernel line and the yellower ears to the cream style line, thus resulting in a more desirable and uniform product for each of the two styles of pack. Similarly, the yellower tomatoes could be directed to the whole tomato line, and the redder tomatoes to the juice line.

Defects: Photometric devices could well be used to remove defective units, since such defects frequently exhibit color characteristics different from sound units. Discolored, rotted, bruised, burnt units could be so removed. Even internal defects such as black heart in potatoes, or internal cork in apples and sweet potatoes could be detected and removed by photometric means.

Figure IV

Chromaticity Diagram



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Vapor-Phase Chromatography

By I. S. Fagerson,
University of Massachusetts

Gas chromatography, vapor phase chromatography or gas-liquid partition chromatography, as it is variously known, is a relatively simple technique for separation of multicomponent mixtures into fractures than can be readily measured and identified. As a method of analytical instrumentation, it has been attracting increasing attention and has already been the subject of two international symposia (London 1956, East Lansing 1957) and will be the subject of a third in Amsterdam this May.

We are indebted to Dr. A. J. P. Martin and Dr. Synge of England (Nobel Prize Winners in Chemistry for 1952) for their concept of chromatography in the gas-liquid state. (1) Although the original idea was proposed by them in 1941, it was not further investigated until about 10 years later when James and Martin (2) published a paper on the analysis of volatile acids using this technique. From this point on interest picked up, particularly in England and Holland. Within about three years commercial instruments were beginning to appear in this country and at last count there are eight manufac-

turers of these analytical instruments in the United States.

There are two basic types of gas chromatography:

(1) Gas-solid chromatography (adsorption type).

(2) Gas-liquid chromatography (partition type).

For purposes of simplicity the following discussion will be mainly devoted to gas-liquid partition chromatography (GLPC).

A typical GLPC instrument has four basic parts:

(1) A sampling system for introduction of the gaseous or liquid sample into the instrument.

(2) The chromatographic column.

(3) The detector.

(4) Recording system.

In addition, the instrument is usually provided with such auxiliary equipment as pressure gauges, flow meters, and a thermostated chamber provided as an integral instrument.

In operation a measured sample of gas (0.1 to 25 cc.) or liquid (1 to 50 ul.) is introduced via a heated sampling system into a stream of carrier gas (usually helium, though other gases such as nitrogen or hydrogen can be used). The volatilized mixture is then swept into a column packed with the system's stationary phase. The latter consists of inert particles such as Celite or kieselguhr which have been coated with a film of a high boiling liquid such as silicone oil, dinonylpthalate, polyethylene glycol, in fact even the household detergent "Tide" has been successfully employed. The Celite or fire brick serves only as a support and to provide a large surface.

In passing through the column, the components of the sample are distributed between the liquid stationary phase and the mobile gas phase. Since the rate of travel through the column depends upon whether the distribution or partition of each component favors the mobile or stationary phase, each component leaves the column at a different time. Thus, each is subsequently carried through a detector or sensing device in its order of emergence. The variation in output of the detector (usually a dual thermal conductivity cell) is plotted by the recording potentiometer as a series of symmetrical peaks, each peak corresponding to a separated component. The area under the peak is a measure of the mol-percent concentration. The location of the peak in time from the start of the analysis is called the retention time or T_R. This T_R value or time required for a component to pass through the column is constant for a particular set of experimental conditions (such as stationary phase, carrier gas, column length, rate of flow of carrier gas and temperature) and can be used for identification of components. Obviously, reference values can be obtained with known compounds under the same operating conditions. In the event the compound is not known, it can be recovered at the exit of the instrument by trapping in a refrigerated bath or in a solvent for subsequent identification by infrared, mass spectrometry or other means.

With present cells a limit of detectability in the order of 10 parts per million is possible. Higher sensitivities may be possible with other detector systems such as the B-ray ionization detector or low-pressure electric discharge detectors where sensitivities on the order of 0.1 parts per million for C_3 to C_7 hydrocarbons have been reported (3).

The method is limited to substances with boiling points up to about 400° C. (752° F.), but for most applications practicality limits this upper range to about 300° C. (572° F.). The temperature limitation is governed by a number of factors, among them boiling point of the liquid stationary phase, thermal stability of the injected compounds, sensitivity of detector and loss in resolution of the column at the higher temperatures. In many cases the boiling point limitation is not absolute since many of these higher boiling compounds can be converted to lower boiling derivatives prior to analysis. For example, certain amino acids may be analyzed if they are first converted to their ninhydrin derivatives (aldehydes with one less carbon atom than the original acids) (4). Higher boiling fatty acids up to C_{30} may be handled as their methyl esters (5).

It should be noted that the choice of column material or stationary phase is one of the most important factors in achieving desired separations. It is, therefore, essential to select a material with specific selectivity for the various components. In more difficult analyses it may be necessary to use several columns, but extremely fine resolutions are attainable with proper column packing materials. Compared with fractional distillation, gas chromatography permits separation with efficiences on the order of 1,500 or more theoretical plates.

Dr. Martin has made the statement that gas chromatography has already made analytical distillation obsolete. Lest this be considered an exaggeration, an example taken from petroleum analysis should be convincing. Here a 29 component gasoline sample can be completely analyzed (quantitatively and qualitatively) in less than 30 minutes, separating such closely related compounds as iso-butane, n-butane, butene-1, iso-butene, butene-2 (trans.), butene-2 (cis) and butadiene 1,3 in the mixture and these are a single sample on the order of milligrams.

The availability of this powerful analytical tool has been noted by food scientists and has aroused much interest as to its applicability to some of the more difficult problems in this area. As indicated previously, GLPC is uniquely suited to analysis of complex systems and one obvious approach is its application to food flavor research. Some indications of things to come have been reported by Stahl and his associates at the Quartermaster Research and Development Center and by Dimick and Corse of the Western Utilization Research Branch of the U. S. Department of Agriculture.

The former have utilized GLPC and mass spectrometry to analyze the volatile fractions of onions, cabbage and irradiated meats. The latter have also used GLPC in conjunction with mass spectrometry and chemical methods to study the volatile flavors of strawberry. With these methods it has been possible to detect and identify components present at a level of 1 part in 100 million by weight.

Lest one became overly optimistic, Lockhart (6) has stated that over 70 pure compounds have been identified by a vacuum distillate of roasted coffee, no one of which could be associated with typical coffee aroma. Though these compounds cannot serve by themselves as coffee aroma, a number of them apparently all contribute to the flavor complex. Changes in the chromatographic spectrum therefore can be correlated with flavor changes. Preliminary research on the application of GLPC to coffee flavor has indicated that "with refinement there is no doubt that this technique could be used to assist in the blending of green coffees for development of new flavors, for the control or roasting, for the attainment of constant flavor and for the measurement of the progress of staling in relation to packaging and shelf life" (6).

Going a step beyond the use of laboratory instruments, there have been recently developed several process chromatographic analyzers which are now commercially available. These appear to be designed primarily for petroleum process stream monitoring. However, their basic design would apply equally well to other applications. Their distinguishing feature is cyclic operation. Briefly, the sequence of operation is as follows:

(1) A measured quantity of sample is automatically taken from the process stream.

(2) The sample is swept into a chromatographic column by the carrier gas.

(3) As the sample is swept through the column, resolution of the sample takes place and the separated components emerge from the column and into a thermal conductivity detector.

(4) Measurement of the thermal conductivities provides quantitative

information on the concentration of the sample components.

(5) The information is presented as a graphic record.

The time required to complete an analysis cycle depends on the number and nature of the components present in the sample and may vary from 5 to 30 minutes. An example of one of the commercial models of an automatic instream gas chromatographic analyzer is the Perkin-Elmer Model 184 process vapor fractometer. The system consists of three components—the programmer, the analyzer and the recorder for readout. The programmer is equipped with a graphic disc timer with four tabs which permit the preselection of any four component peaks for recording. It also indicates to the operator at what point the instrument is in its cycle, when the next peak will be recorded and when the next sample will be introduced. There is also a selector for presentation of data as a bar graph or continuous chart, for calibration or check timing readout.

Process monitoring by gas chromatography is an application for the future as far as the food industry is concerned. Still further into the future is the extension of monitoring to process control. The multiple quantitative and qualitative analyses that can be provided by gas chromatography equipment has tremendous potential as an automatic in-stream process control instrument.

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Infrared Spectroscopy

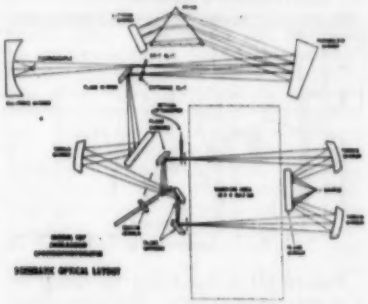
By Abraham Savitsky, Perkin-Elmer Corporation

Infrared spectroscopy has been cited as the most powerful technique available to the chemist for the rapid identification and measurement of organic chemicals. The infrared spectrum of a compound is the most characteristic property of that compound, for it can be considered as a large compilation of data in contrast to a melting point, for example, which is a single piece of information. I would like here to present a picture of the infrared region of the spectrum: what it is, how laboratory measurements are obtained and their meaning, some concept of current infrared continuous analyzers, and most particularly a glimpse into the general problems of application of the techniques.

The infrared region is rather arbitrarily considered to extend from a wavelength of 2.5 microns to about 15 microns. It is rather arbitrary because this is the range in which single crystals of rock salt (common sodium chloride) can be used as a prism material to produce the spectrum; ordinary glass becomes opaque between 2 and 3 microns. The visible region of the spectrum extends from about 0.4 micron; blue, to about 0.7 micron; red, a barely significant distance on this scale. It is easy to distinguish red objects from blue objects, but there are a great many colorless materials. The infrared region of the spectrum, because it is so much larger than the visible, merely extends our vision to the point where practically every material has a slightly different appearance. The frequencies corresponding to this range of wavelengths are those of the atomic vibrations within the molecule. Thus, in a molecule containing carbon and hydrogen, there will always be an absorption band at 3.5 microns, indicative of the interaction of light, vibrating at the frequency corresponding to this wavelength, and the stretching motion between the carbon and hydrogen atoms, which takes place at this same frequency. Practically every material has a more or less unique infrared spectrum. In fact, only the monatomic gases, such as oxygen, nitrogen, helium, do not absorb infrared.

Instruments for obtaining a spectrum consist of a source which emits radiation of all these wavelengths and a monochromator which, by means of a prism and slits, selects out one particular wavelength interval at a time. At each point, the amount of light transmitted by the sample is compared with the light which would have been transmitted if the sample were not present. The ratio is recorded as percent transmission on the graph. Wherever there is interaction between the sample molecules and the radiant energy, the amount of radiant energy is reduced. The reduction in intensity depends on the structure of the molecule and the number of that kind of molecules which are present. Therefore, the intensity of the band in the spectrum of a known molecule can be directly related to the amount of that material present in the beam.

Figure I
Optical Schematic of a Typical Double Beam Infrared Spectrophotometer



Here, then, we have the basis for all absorption methods of analysis.

Figure I is the optical schematic of a typical double beam infrared spectrophotometer. The radiation produced by the source is divided into two beams. One beam passes through the sample which absorbs at its characteristic wavelengths. The other serves as a reference. The two beams are alternately reflected or transmitted by the rotating sector mirror to the monochromator which passes only a single wavelength interval to the detector. The detector senses any differences between the sample and reference beams and, via a servo amplifier, automatically adjusts the optical attenuator to maintain balance. Thus if, at a particular wavelength, the sample absorbs 25 percent of the incident energy, the attenuator will be adjusted so that it too absorbs 25 percent. The attenuator position is therefore a measure of the absorption by the sample. A pen connected to the attenuator records the transmission of the sample as the wavelength is continuously varied by rotating the Littrow mirror. Figure II is a photograph of this instrument with the pen recording a spectrum on the vertical drum. Samples are contained in cells placed in the sampling area. This particular instrument records the spectrum from 2.5 to 15 microns in about 12 minutes.

Figure II
Photograph of the Infracord Spectrophotometer

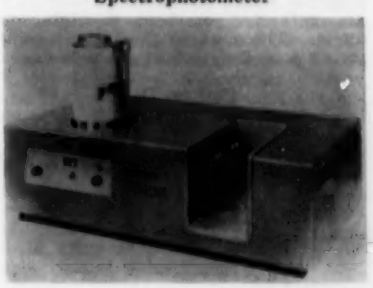


FIGURE III

Infrared Spectrum and Functional Band Assignments of Polystyrene

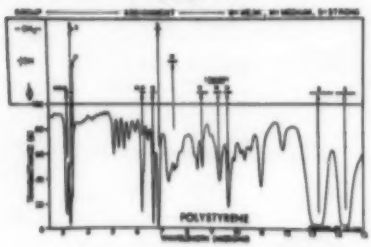


Figure III is the infrared spectrum of a polystyrene film. Position, shape and intensity of the absorption bands are all characteristic of the particular compound. The arrows show the correspondence between intensity and position of various bands with empirically determined "functional group assignments". Thus, a band will always be present in the 3-4 micron region of the spectrum of C-H containing materials. Alkyl C-H bands are at a slightly longer wavelength than aromatic C-H. The two strong bands at 13 and 14 microns confirm the presence of monosubstituted aromatic ring, etc.

Samples are normally placed in rock salt sample cells. Water solutions, therefore, are a problem which has been solved with special cell materials or by dispersing the sample in potassium bromide.

The laboratory infrared spectrometers are not, of course, designed to be used under process conditions. There are no provisions for continuous sampling, or for explosion-proofing. They will not operate unattended for the long periods required of a process instrument.

An instrument which has been designed for this particular function is shown in optical schematic form in Figure IV. The optical elements shown here are, of course, all in an explosion-proof enclosure. Starting at what is usually considered the end of the instrument, the group of components in the upper lefthand corner comprises the monochromator portion of the device. Radiation enters the entrance slit, is rendered parallel by a parabolic mirror and passes through a prism where different wavelengths are refracted or bent to different angles. The angle of the Littrow mirror at A or B determines which wavelength will be reflected back through the system, out the exit slit, and fall onto the detector. The usual laboratory spectrometer has only one Littrow mirror which is moved smoothly from one angle to another, to scan the wavelength range. In this instrument, there are two Littrow mirrors, which are fixed in position. One selects a wavelength at which the sample absorbs, the other selects a wavelength which can be used for a reference, and which compensates for changes in the source, dirt in the sample cells, variations in gain of electronic components, etc.; that is, those changes which may occur in the system, but which are not changes in composition of the sample. Radiation from the source is focused first in the sampling cell area, and then by a second set of mirrors onto the entrance slit. The chopper is essentially an optical switch, which first switches energy at the sample wavelength, and then energy at the reference wavelength, through the sample cell. Any differences in the amount of light transmitted by the sample are detected and used in a closed-loop servo system, to bring the energies at the two wavelengths to a balance. The position of the balancing trimmer is a measure of the amount of energy absorbed at the sample wavelength, relative to the reference wavelength, and is, therefore, a measure of the sample concentration.

FIGURE IV

Bichromator Analyzer Optical Schematic

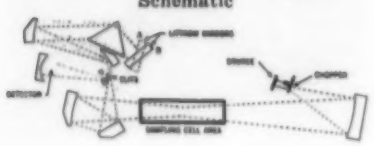


FIGURE V

Cutaway View of the Bichromator Analyzer in Explosion-Proof Enclosure

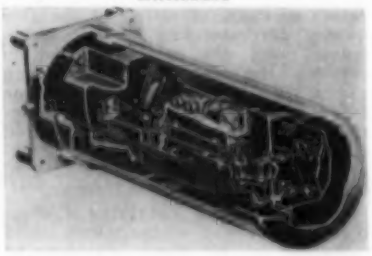


Figure V is an artist's rendering of the optical assembly. The bichromator unit which disperses the wavelengths is at the left with the two Littrow mirrows, which are set at different angles. The chopper and source are at the right. The sample cell is a separate, purgeable compartment, essentially outside of the main optical assembly, so that the sample can be thermostated at a temperature different from the instrument temperature.

Actually, the dispersive-type of infrared analyzer, although it is most closely related to the laboratory instrument, is a relative newcomer to the analytical picture. For the past ten years or so, there have been available many variations on the non-dispersive analyzer. The distinction between the two is made from the presence of a prism, which disperses the energy into a spectrum in the dispersive analyzer. The non-dispersive analyzer is somewhat like a filter photometer, using gases or vapors of a desired component as filters.

FIGURE VI

Schematic of Non-Dispersive Analyzer

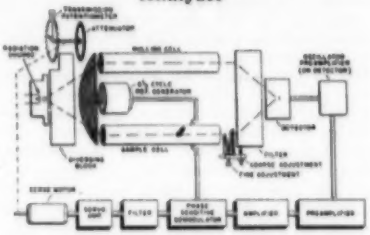


Figure VI is a schematic of a typical infrared non-dispersive analyzer. The operation can best be illustrated by considering the detection of carbon dioxide. A partial pressure of this gas is placed in the detector. The detector consists of a chamber in which radiation is absorbed by the CO_2, causing it to heat up and expand slightly. The pressure change deflects a very thin aluminum foil, which is part of a condenser microphone, and so produces an electrical signal which is proportional to the amount of energy absorbed by the CO_2. You may notice that the detector is sensitive only to the particular wavelengths at which CO_2 absorbs, and is insensitive—essentially is totally blind—to all other wavelengths. Energy from the radiation source at the left passes alternately down the nulling cell and then the sample cell, as determined by the chopper, and falls via a filter cell onto the detector. Assuming that there is no radiation-absorbing material in the sample cell, the energy passing down the two beams on the alternate half-cycles will be equal, and there will be no net output from the detector. If some CO_2 is now passed into this sample cell, it will absorb radiation at its characteristic wavelengths, which are the same wavelengths that the detector is capable of seeing, and therefore there will be a difference in the amount of energy reaching the detector from the sample beam and the nulling beam. This difference will produce an electrical signal at the detector which is amplified and is fed to a servo motor which positions an optical attenuator in the nulling beam until the amount of energy going down the two beams is again balanced. The amount of energy removed by the attenuator must be the same as the amount of energy removed by the CO_2 in the sample cell, and therefore the attenuator position is a direct measure of the amount of CO_2 in the sample cell.

What happens when there are also other absorbing gases in the sample cell? Then, if there are overlapping bands they, too, will absorb energy from the sample beam, and will therefore affect the instrument reading, as though there were additional CO_2 present. Two solutions are possible: the simplest involves introduction of some of the interfering gases into the filter cell. There they effectively absorb all of the overlapping wavelengths so that now the detector is sensitive to only those bands of CO_2 which have no overlap. Where the overlap is too severe to be remedied by this procedure, it is often possible to go through a procedure of compensation.

FIGURE VII

Photograph of Non-Dispersive Analyzer

Figure VII is a photograph of a non-dispersion analyzer. I chose this particular photograph because, although non-dispersive analyzers are usually considered to be gas analyzers, in very special cases they can be used for the analysis of relatively simple liquid mixtures. This instrument is a monitor to detect the presence of small amounts of light water in high purity heavy water. The detector and preamplifier are at the right. The quarter-inch tubing lines in the front of the instrument are inlet and outlet of sample. Source is at the left and the blower and heater assembly at the far left are part of the thermostating system. This particular instrument is not intended to be explosion-proof. Most of these analyzers, I should point out here, have been aimed at the petroleum and chemical fields, where explosion-proofing is a must.

As an example of the problems and pitfalls in the application of these analyzers to specific problems, let me cite just one example which we looked at a number of years ago. We were asked to look into the possibility of controlling the endpoint of the hydrogenation step in the hardening of fats for use in margarine. The particular manufacturer had recently installed a modern hydrogenation unit complete with graphic panel in which the steps of feeding material into the batch-reactor-tank, heating the batch, addition of catalyst, and environmental control of hydrogenation were all done automatically at a push of a button. After hydrogenation was completed the steps were also automatic; draining of the tank, filtration of the catalyst and pumping the hardened fat to storage were all done automatically.

There remained, however, the crucial problem of just when to stop hydrogenation. It was being done when we were approached by having the operator take spot samples to follow the reaction on a laboratory refractometer. And when the refractive index reached some value (different for each batch of raw material), the hydrogenation was stopped and a sample was sent to the lab for a Wilev Meltingpoint determination. If satisfactory, the batch was dumped. Usually the report came back (in half an hour) to "hydrogenate some more" and then another sample went out, etc. The final margarine was a blend from a number of batches.

Aside from the fact that there were no commercial process refractometers available at the time, it is important to note that the refractive index was not the determining criterion in dumping the batch.

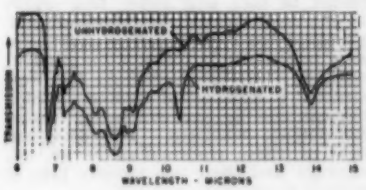
We first took a quick look at the spectrum (Figure VIII) of the original and final materials and were pleasantly surprised to see a nice strong band around 10 microns. Natural oils apparently always have a cis configuration around the double bonds of the unsaturated fatty acids. During early stages of the hydrogenation procedure there is, in addition to hydrogenation of the double bond, considerable isomerization to the trans configuration which gives rise to this band. The take-up of hydrogen and change in refractive index parallel the increase and intensity of this band. And the higher melting point trans-material definitely contributes to the hardening of the fat.

Unfortunately in some stage in the hardening process, the rate of decrease of double bonds wins out over the rate of increase of trans-material, and the curve levels out and then decreases with further hydrogenation. The critical point in margarine production is at the least sensitive portion of this curve and so that analysis was out.

We then looked further out and saw the change at 15 microns which is small, but increases uniformly with hydrogenation and we were all set, except for one thing—what value is to be used for the end point? Obviously, we needed a determination of "quality of margarine" vs. some physical property which they were now measuring and a comparison of that physical property with our infrared data. We never did find out the criterion for a "good margarine" but we did try to correlate our readings with other physical data which they have and this was most interesting. Not only did we get scattering of points with the bichromator against refractive index, melting point, iodine value, dialatometer readings and penetrometer readings, but no two of these criteria gave any better correlation. Apparently it just takes an experienced eye, a "feel" for the blending and the final criterion—did it bake a good cake? We gave up.

FIGURE VIII

Infrared Spectrum of Hydrogenated and Unhydrogenated Vegetable Oil



Finally, I would like to review two recent applications of infrared. The first, using a continuous analyzer, while not at all related to this industry, may suggest some applications, while the other is the solution of certain canning problems using a laboratory instrument.

Many of you are aware that a number of the 1958 cars are equipped with air suspension systems in place of the conventional springs. The air suspension system has a compressor, air springs and interconnecting piping, and all parts must be pressure tight. Leak testing of the production line was a very real problem. Soap bubbles were simplest, but not nearly fast or sensitive enough. The mass spectrometer type of helium leak detector, while extremely sensitive for vacuum systems, is not particularly suited to pressurized systems. The halogen leak detectors presented a toxicity problem. The assembly lines are currently using non-dispersive infrared analyzers sensitive to nitrous oxide (laughing gas), the propellant for aerosol whipped cream. The air suspension systems are filled with a mixture of air plus a small percentage of nitrous oxide and the operator gets both an audible and visual indication of a leak.

The second problem concerns the examination of organic can coatings to determine the "proper bake," possible deterioration, the thickness of a coating, or even the composition of a competitor's product. Sometimes the coating is stripped and placed directly into the spectrometer beam. However, it is almost as easy to compare the reflectance of a coated can stock with an uncoated using samples about 2 inches or less in diameter. Since the beam must pass through the organic coating before reflecting off the metal, the result is the absorption spectra of the coating. The proper bake can be specified as a certain intensity of the side band at 6.1 microns. Film thickness can be determined by computation from interference fringes such as those in the spectrum of polystyrene.

SANITATION OF CANNING EQUIPMENT

(jointly sponsored by N.C.A. and C.M.&S.A.)

PRESIDING: E. S. DOYLE, Research Laboratory, N.C.A., Berkeley, Calif.

ADDRESS: "More Effective Product Washing with Less Water"—WALTER A. MERCER, Research Laboratory, N.C.A., Berkeley, Calif.

ADDRESS: "The Effect of Post-Cooling Can Handling Equipment on Spoilage Rates"—J. N. DEMSEY, Continental Can Co., Inc., Chicago

ADDRESS: "Bacteriological Studies on Post-Cooling Can Handling Equipment" —C. W. BOHRER and J. YESAIR, Research Laboratory, N.C.A., Washington, D. C.

More Effective Product Washing with Less Water

By Walter A. Mercer, W. W. Rose, C. E. Butler, and M. M. Appleman, Western Research Laboratory, National Canners Association

INTRODUCTION

The canning industry must learn to use less water. Widespread current and potential shortages of water make this a necessity. Food canning must always require water of the highest quality, but use of water must be reduced to the lowest volume which will allow an efficient and sanitary canning operation. Reduced water usage can be rewarding, not only in conserving a commodity so vital to the canner, but also because an important result will be reduction in volume of the liquid wastes whose disposal becomes more troublesome each year.

The National Canners Association has undertaken long-range research on the possibilities and problems of water conservation in canning. An important part of this research is a study of water usage in product washing. This continuing investigation has the following objectives:

(1) Reduction in water consumption through more efficient use of product wash water.

(2) Prevention of spoilage or other sanitation problems which can result from indiscriminate water saving practices.

(3) Submission of results to canners and canning machinery manufacturers as a basis for improvement of product washing equipment.

This report discusses the progress of studies designed to investigate the effect of water volume and method of application in tomato washing.

WATER-SAVING POSSIBILITIES IN TOMATO WASHING

Water reuse and more effective application of water in canning are the only apparent means of saving appreciable volumes of water. Surveys by N.C.A. show that much processing water now wasted in canneries could be reclaimed for further use. Table 1 shows the percent reductions in water use which are possible with various reuse procedures in tomato canning. Among these, recirculation of product wash water is a common water saving procedure. However, it is a matter of record that indiscriminate recirculation of wash water has been the cause of serious spoilage problems.

Reductions in water consumption must be accomplished by procedures which cause no undesirable effect on the physical appearance, nutritional qualities, or sanitary condition of the product. Water reclaimed for use in contact with the product must be low in total bacteria count, free of microorganisms having public health significance, and should contain no materials which could constitute adulteration of the product.

The cooling of cans requires approximately 30 percent of total water usage in canning. Recirculation of can cooling water as cooling water is generally the most efficient way of conserving water in the cannery. Chlorination of cooling water affords a simple means of preventing bacteriological problems. However, the facilities for cooling water are now an expensive installation. Where recirculation of can cooling water is not feasible its use for product washing should be considered.

In the preparation of tomato concentrates the volume of water discharged from the evaporators is often larger than that from any other single operation. Generally, there is no attempt to cool and reuse this water in the evaporators. Its elevated temperature has rightly caused most canners to hesitate in using it for product washing. However, N.C.A. has now studied a number of systems which use can cooling and evaporator water for tomato washing. The temperature of these waters can be an advantage and their use trouble free if proper precautions are taken.

IMPORTANCE OF EFFECTIVE PRODUCT WASHING

BASIC PURPOSES OF WASHING TOMATOES

Water used in tomato washing operations not only prepares the tomatoes for canning by removing unsanitary extraneous material but may also serve to transport the tomatoes and to prevent product damage by cushioning their transfer in successive line operations. The problems involved in tomato washing can be better understood if the basic purposes of the washing are kept in mind. Not necessarily in the order of their importance, these purposes can be listed as follows:

(1) Removal of microorganisms, especially mold and spoilage bacteria.

(2) Removal of soil.

(3) Removal of insect eggs and fragments.

(4) Removal of chemical residues such as insecticidal dusts and sprays.

(5) Removal of organic debris such as leaves and stems.

The degree of cleanliness of the washed tomatoes depends on the extent of accomplishment of these basic purposes. The effectiveness and efficiency of various methods of washing can be known by measuring the removal of contaminants from the tomatoes. In the studies reported here, only the removal of bacteria, soil and organic debris was measured. Future studies will also measure the removal of fly eggs, mold, and other contaminants. However, it is reasonable to assume that removal of the latter contaminants will be closely correlated with that of bacteria and soil.

IMPORTANCE OF REMOVING SPOILAGE-TYPE BACTERIA

Investigations by N.C.A. of instances of spoilage in canned tomato products indicate that a major cause of such spoilage is failure in the washing operation adequately to remove heat-resistant microorganisms of the butyric acid or flat-sour groups. Flat-sour spoilage of canned juice and swell spoilage of peeled tomatoes, juice, and light-weight concentrates, result from the growth of bacterial spores which

This investigation was supported in part by Research Grant No. E-14 from the Bureau of State Services (Division of Sanitary Engineering Services) U. S. Public Health Service.

survive the process given the cans. The adequacy or inadequacy of the sterilizing process depends on the number of heat-resistant spores present in the can. Recommended processes could be reduced if there could be assurance that the number of bacterial spores is also reduced.

During recent canning seasons an increase in the number of spoilage outbreaks has been attributed to heavy production schedules which resulted in overloading of washers designed for much lighter product loads. Outbreaks of spoilage occur most frequently during peak production when the washer capacity is more often exceeded. Morning dews and rains which increase soil contamination also increase the chances of spoilage. Bacteriological examination of tomatoes delivered to a cannery throughout the season will show that the bacterial load increases as the season progresses.

An objective of N.C.A. studies on product washing is to determine the levels of bacterial spore contamination which, when found on the product entering the can, will indicate that spoilage can be expected. A number of variables must be considered among which the lethality of the process is most important. As yet, sufficient data are not available to indicate definitely satisfactory or unsatisfactory spore counts for washed tomatoes. Table 2 gives the averaged results of repeated sampling of tomatoes from a number of different washing operations. The counts listed under the heading "satisfactory counts" are for tomato samples from canneries where no significant can spoilage occurred. Under the heading "unsatisfactory counts" are averaged results for samples from canneries where spoilage occurred. Both satisfactory and unsatisfactory counts are included in the "industry average" count.

It must be remembered that the lethality of the process given by each canner was not considered in this arrangement of counts. However, experience has shown that with average processes some spoilage will occur if counts on washed tomatoes remain in the vicinity of the unsatisfactory counts.

IMPORTANCE OF REMOVING SOIL FROM TOMATOES

Field soil is the major source of the bacterial spores which spoil canned tomato products. If the temperature of flume or soak tank waters is controlled at 80° F. or below, then field soil is the only source of these heat-resistant spoilage organisms.

Analyses of a large number of soil samples from tomato fields have shown alarmingly high counts for spores able to spoil canned tomatoes. A summary of these spore counts is given in Table 3. The spores counted are able to survive heating in water at 170° F. for 10 and 20 minutes, respectively, for the mesophilic and thermophilic counts. The mesophilic organisms were grown at 86° F. and the thermophilic at 130° F. Especially significant are the flat-sour spore counts developed on tomato juice agar since this culture medium has a pH of 5.0. Bacteria growing on this medium may also grow in canned tomato products.

Soils from fields planted repeatedly to tomatoes, sugar beets, beans, melons, potatoes, and similar crops appear to be more highly contaminated than soils from fields planted to crops producing less organic waste and less carbohydrate to be decomposed in the soil. Soil analyses indicate a correlation between organic content and spore numbers. Examination of decaying tomatoes recovered from the soil show extremely high counts for heat-resistant spoilage type spores. Soil is a good storage medium for *bacterial* spores. In the laboratory, spores in soil remain viable for many years. It seems entirely possible that canning crop fields become more contaminated each year.

The amount of soil on tomatoes delivered to the cannery is surprisingly large. This is especially true for growing areas where the soil is heavy and rain or irrigation cause its adherence to the tomato. Soil contamination as high as 8 pounds per ton of tomatoes has been measured. Bacteriological results of an extensive sampling of tomatoes from lug boxes (Table 4) emphasize that in the prevention of spoilage the removal of soil from tomatoes is the most important objective in the washing operation.

FACTORS INFLUENCING THE EFFECTIVENESS OF THE PRODUCT WASH

A number of difficult-to-define factors influence the effectiveness and the efficiency of tomato washing operations; and, consequently, the margin of safety for the canned product from spoilage or other contamination problems. Some of the more important factors are discussed here.

TABLE 1

Water Saving through Reuse of Water in Tomato Canning

Water Use Situation	Gallons of Fresh Water Used Per Ton of Tomatoes				Percent Reduction in Water Usage
	Can Cooling	Product Washing	Other Uses	Total Use	
No Recirculation or Reuse of Water in any Operation	1,200	1,320	820	3,340	
With Recirculation of Product Wash Water	1,200	805	820	2,825	16
With Recirculation of Can Cooling Water	462	1,320	820	2,602	22
With Recirculation of Wash Water and Cooling Water, and Reuse of Evaporator Water for Product Washing	462	525	740	1,827	45

TABLE 2

Spore Counts on Tomatoes after Their Final Wash

	Per Pound of Tomatoes		
	Industry Average	Satisfactory Count	Unsatisfactory Count
Flat-Sour Spore Count:			
Glucose-tryptone agar (pH 7.4)			
Mesophilic (86° F)	7,943	5,670	9,610
Thermophilic (130° F)	2,480	754	3,488
Tomato Juice agar (pH 5.4)			
Mesophilic (86° F)	1,911	967	3,744
Thermophilic (130° F)	306	198	622
Anaerobic Spore Counts:			
Mesophilic (86° F)	140	79	168
Thermophilic (130° F)	9	5	14

TABLE 3

Bacterial Analysis of Tomato Field Soils

Type of Spores Counted	Range of Counts per Gram of Soil		
	High	Low	Average
Aerobic Spores:			
Mesophilic	53,000,000	5,900,000	32,000,000
Thermophilic	20,900,000	930,000	9,645,850
Anaerobic Spores:			
Mesophilic	2,300,000	460,000	5,938,330
Thermophilic	280,000	35,000	577,000
Spores on Tomato Agar:			
Mesophilic	33,700,000	334,000	10,776,000
Thermophilic	358,000	2,300	96,440

PRE-WASHER HANDLING OF TOMATOES

The condition of the tomatoes when received at the washer has a great influence on the sanitary condition of the tomatoes going into the can.

Rough handling which results in increased breakage before or during the washing operations always results in an increase in the amount of soil and the number of bacterial spores remaining in or on the tomatoes after their final wash. Even the most vigorous washing does not adequately remove contaminants taken into the tissues of the tomatoes.

Table 5 gives average counts for a great number of samples of whole and broken tomatoes taken from the same washing system. The bacterial load for broken tomatoes after the final wash is approximately seven times greater than that for whole tomatoes. The spoilage significance of this heavy contamination for broken tomatoes is more clearly recognized when it is considered that in many canning operations broken tomatoes are diverted to the manufacture of juice, sauce, and paste. Because of this, an unprocessed can of any one of these products could contain enormous numbers of heat-resistant bacterial spores.

Observations have indicated that common causes of pre-washer damage to tomatoes are (1) overloading of boxes in the field which results in crushing of tomatoes when the boxes are stacked; (2) prolonged holding of tomatoes after picking, resulting in tissue breakdown and increased fragility; (3) rough handling of boxes at the dump site; and (4) impingement of tomatoes on load dividers and other obstructions on belts or in flumes.

SANITARY CONDITIONS OF THE WASH WATER

The condition of the water in which tomatoes are soaked or flumed has a marked effect on the sanitary condition of the tomatoes entering the can. Increases in the concentration of soil and other debris are correlated with increases in bacterial contamination of the water. In many washing operations studied, tomatoes leaving a flume or soak tank were more heavily contaminated with bacteria than when sampled from the lug box.

One of the most difficult and important requirements in tomato washing is prevention of soil build-up in tank or flume washers. This is especially true when the water is recirculated. Figure I shows the relationship between numbers of flat-sour type spores and the concentration of soil in tomato wash water. Indiscrimate recirculation of wash water can cause serious spoilage problems. Addition of sufficient dilution water to prevent excessive soil build-up is extremely important in spoilage prevention.

The temperature of the average reclaimed can cooling water ranges from 90°F. to 100°F.; that of evaporator water ranges from 120°F. to 130°F. If these warm waters are used in soak tanks or flumes, the volume added should not elevate the water temperature above 80°F. This especially applies if recirculation is practiced. Sufficient cold water must be added to the system to maintain this temperature control. Otherwise, the hazards of bacterial spoilage are greatly increased. Use of warm waters in "one-pass" washing operations has no bacteriological consequences.

If the temperature of recirculated wash water cannot be controlled at 80°F. or below, then chlorination of the water is considered to be necessary. Use of hypochlorite either in tablet or solution has been found to be a convenient method of chlorinating flumes and soak tanks. Maintenance of an effective level of chlorination is difficult since much of the added chlorine will be neutralized by organic material in the water. However, even trace amounts of chlorine will cause marked reductions in the total numbers of bacteria. Effective chlorination will improve sanitation of the washing equipment, and some evidence is available which indicates that mold counts in the canned product are reduced by chlorination. If this is the case, it is thought to be due to elimination of equipment mold.

Use of chlorine in the wash water does not eliminate the need to prevent soil build-up in the washers. The heat resistant bacterial spores added to the water in the soil washed from tomatoes are also chlorine resistant. Even high concentrations of chlorine require several minutes to kill these spores.

The use of detergents in wash water to facilitate the removal of soil and especially fly eggs is being studied by the N.C.A. laboratory. Preliminary results show that tomatoes after their final spray wash contained no measurable residue of an anionic detergent added in the dump section of a flume washer. Whether use of the detergent gave cleaner tomatoes has not yet been determined. Other workers have reported good results in removal of fly eggs.

Experimental results in the laboratory indicate that caution should be used in selecting a detergent for use in tomato washing. If chlorination is depended upon to maintain sanitary conditions in a washer, the detergent selected should be compatible with chlorine. Many of these compounds quickly neutralize chlorine. Some detergents when used in the recommended concentration add sufficient alkali to the water to raise its pH to 10 or above. Any carry-over of alkali in the tissue of broken tomatoes would appear to be hazardous since the minimum cooks assigned for tomato products assume a normal pH for the tomato.

Conveying unwashed tomatoes on a dry belt has been shown to cause significant increases in bacterial contamination (Table 6) as well as considerable product loss. The breakage of tomatoes on belts causes an accumulation of organic debris which entraps spore-bearing soil and forms a growth medium for mold and slime-producing organisms. Water sprays properly located over and under the belt will greatly improve its sanitary condition. If possible, the spray water should be chlorinated, but the scrubbing action of a high pressure spray is most important in cleaning the belt.

TABLE 4

Spore Counts on Tomatoes Received at the Cannery

Type of Spores Counted	Average No. of Spores per lb. of Tomatoes	
	Mesophilic	Thermophilic
Flat-Sour Spores:		
Glucose Tryptone Agar (pH 7.4)	81,326	11,002
Tomato Juice Agar (pH 5.4)	39,513	1,060
Anaerobic Butyric-Type Spores:		
Liver Broth Tubes	1,919	176

TABLE 5

Comparative Counts for Bacterial Spores on Whole and Broken Tomatoes after their Final Wash

	Whole Tomatoes	Broken Tomatoes
Flat-Sour Spore Count:		
Glucose Tryptone Agar (pH 7.4)		
Mesophilic	11,384	70,309
Thermophilic	4,263	8,514
Tomato Juice Agar (pH 5.4)		
Mesophilic	1,585	10,513
Thermophilic	258	1,355
Anaerobic Butyric-Type Spores:		
Mesophilic	176	1,954
Thermophilic	8	34

FIGURE I

Relationship between Numbers of Flat-Sour Spores and Concentration of Soil in Tomato Soak-Tank Waters

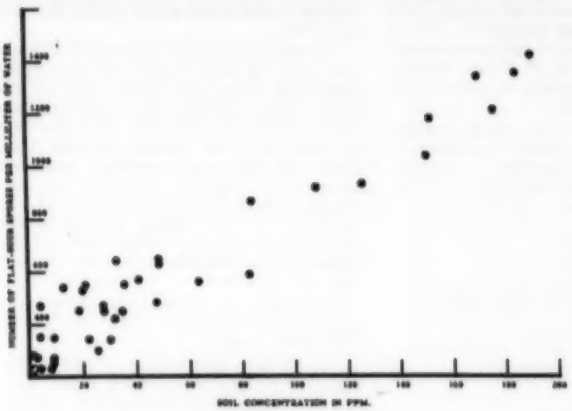
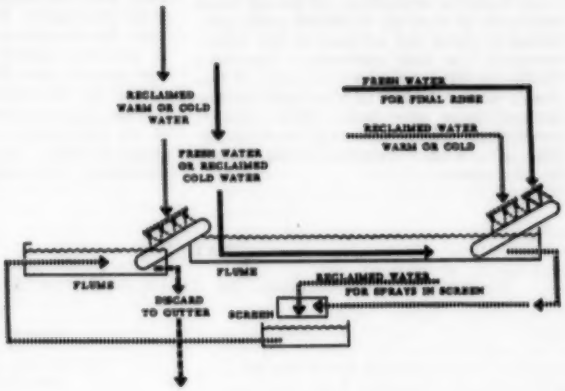


FIGURE II

Suggested Arrangement of Flume System for Use of Reclaimed Water in Tomato Washing



EFFECT OF VARYING THE VOLUME OF WASH WATER USED

When the operation of the tomato washer remains constant and the method of applying water to the product is the same, the degree of cleanliness of the washed tomatoes varies directly with increases or decreases in the volume of wash water used. This relationship is shown in Table 7.

The most important fact evident in Table 7 is that some of the washing systems used less water per ton of product yet obtained cleaner tomatoes. System No. 4 used approximately two times the volume of water used in System No. 1, yet the percent removal of contaminants was considerably less. This emphasizes the fact that much of the effectiveness of the product wash depends on the method of applying the water to the product.

COMPARISON OF METHODS OF WASHING TOMATOES

The N.C.A. laboratories are comparing, under cannery conditions, the washing performance of different types of washers. This comparison is based only on the degree of removal of contaminants and the volume of water required to obtain clean tomatoes. No attempt is made to compare production or operational features.

For these comparative studies, tomato washers have been observed with the following basic points in mind:

(1) Satisfactory removal of soil, microorganisms, and insect eggs and fragments.

(2) Volume of water needed for satisfactory removal of contaminants.

(3) Time and materials required for maintenance of sanitary condition.

(4) Product damage and loss in the washer.

This study of different types of washers is not yet complete. The present discussion is considered as a progress report.

Reel-type Washers — Included in these field studies were reel washers used as the only washing equipment and, in other instances, as a final spray rinse following a soak-tank wash. For the reel-type washers studied, the percent reduction in bacterial contamination on washed tomatoes has been lower than for other types of washers. This inferior performance is attributed to the following:

(1) Plugging of spray nozzles which were not accessible for opening until the reel was stopped at the next shutdown period.

(2) Displacement of tomatoes by rotation of the reel to an area outside the effective range of the sprays, the degree of displacement depending on the tomato load and the speed of the reel.

(3) Abrasion of tomatoes, allowing penetration of bacterial spores into skin and tissue from which further washing failed to remove them.

(4) Accumulation of leaves, stems, and tomato fragments on water supply lines running through the top of the reel, resulting in a continuous drip of contaminated water onto the tomatoes.

(5) Product loss was considerably higher for the reel washers than for other types tested.

Soak Tank-and-Spray Washers— The most common washer unit considered in these studies consisted of a soak tank and a spray wash arrangement in which a belt moved tomatoes from the tank and beneath overhead sprays.

The practice of soaking tomatoes previous to a final spray wash aids in loosening soil and other contaminants. The type of soil on tomatoes determines to some extent the minimum soak time required. Sufficient information is not yet available for establishing soak-time recommendations. However, observations indicate that it should be as short as possible since prolonged soaking in the water usually found in these tanks greatly increases bacterial contamination.

Agitation produced by air injection into soak tanks or flumes apparently increases the effectiveness of the soaking operation. Agitation by steam injection should not be used since any advantage gained from elevation of the water temperature is more than offset by the greatly increased hazards of spoilage from heat-resistant bacteria which multiply in the warm water.

A frequent criticism in the study of soak tank operations was the condition of the water in the tank. As already pointed out, the water can become so heavily contaminated that tomatoes leaving the tank will be dirtier than when entering the tank. When the total solids concentration of the water reaches a high level (Table 8) the final spray wash cannot remove all the added contamination. This emphasizes the great importance of maintaining an adequate flow of water into and out of the soak tank.

Experimental studies have indicated modifications in the usual design of soak tank washers which will improve their washing efficiency. The position of the overflow outlet from the tank was found to influence the condition of the water. Many of the tank washers studied were provided with an overflow which drew water from a level considerably above the lowest point in the tank. Spore-laden soil and organic sludge settled out in the bottom and were not withdrawn by the overflow. When the overflow outlet was located at the lowest point in the tank the continuous flushing action prevented this accumulation of

soil and sludge. Bacterial counts before and after this modification have shown that the condition of the water was greatly improved.

A further criticism of many tank washers is that an overflow port, provided to skim the surface of the water beneath the belt conveying tomatoes from the tank, discharges most of the fresh water added to the tank by the sprays over the belt. This water, needed to dilute the high concentration of soil and organic debris, is lost to the gutter.

In many cases, tomatoes are conveyed on a belt to the soak tank. Often, the edge of the tank acts as a scraper on the return side of the belt, and the accumulated debris falls into the tank. The condition of the belt, the tomatoes, and the wash water is greatly improved if water sprays are placed over the belt at some point ahead of the washer.

The maintenance of a tank washer in an acceptable sanitary condition is simpler after elimination of ledges, shoulders, or other unnecessary projections into the tank on which organic material can accumulate. Such accumulations can support the growth of mold and cause a measurable increase in the mold count of the finished product.

Flume-and-Spray Washers—Flumes are now widely used in conveying tomatoes from the dump site to the final spray wash. No evidence has been found to indicate that the use of flumes of a greater length than that of the conventional washers necessarily insures a better product wash. There is evidence that if the condition of the flume water is not satisfactory the bacterial load on the tomatoes is increased by the longer stay in the water.

The use of flumes to transport tomatoes is thought to offer the following advantages:

(1) Wider separation of the dumping site from the canning lines, thus improving general sanitation, lessening fly problems, and allowing better utilization of cannery floor space.

(2) Increased yields because of less product damage, particularly when flumes are substituted for belt conveyors.

(3) Reductions in water consumption because of better control of water volume to product load.

(4) Reductions in operational and sanitary maintenance costs.

Experimental results indicate that an extensive fluming system should be divided into two sections. A short dumping section should be separate from the remainder of the flume. Most of the soil and debris from the tomatoes and the boxes dumped over the flume will be contained in the first section and will not be in contact with the tomatoes during their passage through the entire flume system.

The rate of water addition to and from the dump section should be adequate to prevent excessive soil buildup. Water can be conserved if the overflow from the last flume section and water from the final spray wash are reused as make-up water in the dump section (Figure II). Tomatoes leaving the dump section should be spray washed. This practice has been shown to make considerable improvement in the bacteriological condition of the water and the tomatoes in the last flume.

Importance of Final Spray Wash

The degree of removal of contaminants from tomatoes passing through a washing system depends largely on the effectiveness of the final spray wash (Table 9). The use of large volumes of water in soak tanks or flumes does not eliminate or lessen the need for a vigorous spray wash. In one washer system without a final spray wash, use of 1100 gallons of wash water per ton of tomatoes gave a reduction of only 63 percent in the bacterial load. With the total volume of wash water reduced to 500 gallons

TABLE 6

Increase in Contamination for Tomatoes Conveyed on a Dry Belt

Type of Spores Counted	Average No. per lb. of Tomatoes at Sampling Points	
	Before Belt	After Belt
Flat Sour Spores:		
Glucose Tryptone Agar		
Mesophilic	21,350	52,205
Thermophilic	3,032	15,802
Tomato Juice Agar		
Mesophilic	4,644	9,740
Thermophilic	165	1,032
Anaerobic Butyric-Type Spores:		
Mesophilic	1,190	3,498
Thermophilic	81	236

TABLE 7

Relationship between Volumes of Water Used and Product Cleanliness in Tomato Washing

Identity of Washing System Studied	Gallons of Wash Water Per Ton of Tomatoes	Percent Removal of Extraneous Matter		
		Soil	Organic Debris	Bacterial Spores
System No. 1	469	42	49	31
	627	72	64	79
System No. 2	650	40	38	32
	805	76	53	50
System No. 3	630	76	63	83
	968	80	71	95
System No. 4	1,140	33	30	6
	1,402	56	61	14

TABLE 8

Soil and Spore Concentrations on Tomatoes Before and After Soaking in Water with Varied Total Solids Content

Total Solids in Soak Tank Water	Concentration of Soil lbs./1000 lbs. of Tomatoes			Butyric Acid Type Spores No./lb. of tomatoes		
ppm	Before	After	Difference	Before	After	Difference
1,329	0.53	0.19	64% reduction	165	23	86% reduction
1,467	0.42	0.13	70% reduction	110	15	86% reduction
2,795	0.62	0.57	8% reduction	43	76	53% increase
3,215	0.52	0.51	2% reduction	110	163	50% increase
4,220	0.47	0.51	9% increase	166	366	120% increase

TABLE 9

Importance of Final Spray Wash for Removal of Spoilage-Type Spores

Type of Washer Used	Average No. of Spores Counted per lb. of Tomatoes Before and After Sprays					
	Flat Sour Spores			Butyric Acid Spores		
	Before	After	Percent Reduction	Before	After	Percent Reduction
Sprays over roller belt after soak	16,914	981	94	1,631	52	97
Sprays over mesh belt after flume	4,440	2,369	47	819	400	51
Sprays over roller belt after flume	11,739	1,355	88	1,539	256	84

per ton, but use of 200 gallons of this as a final spray wash, the reduction in bacterial load averaged 90 percent.

FACTORS INFLUENCING THE EFFECTIVENESS OF THE FINAL SPRAY WASH

Results of experimental studies show that the effectiveness of the final spray wash in removing contaminants is influenced by the following mechanical or physical factors:

(1) Construction of the belt conveying tomatoes beneath the sprays.

(2) Location of the sprays with respect to height and space above the belt and product.

(3) Volume, pressure, and pattern of the sprays.

(4) Temperature of the water.

Construction of the belt—Experimental studies have compared the sanitary condition of tomatoes spray washed on roller belts and belts of solid or mesh construction. On this basis, tomatoes spray washed on a roller belt are cleaner than when washed on other types of belts. On the roller belt turning of the tomatoes under the sprays allows all surfaces to be washed, whereas on other belts only the top surface is exposed to the sprays. Especially poor washing was obtained when tomatoes were spray washed on cleated, elevator-type belts. Piling-up of tomatoes in the angle between the belt and the cleat prevented thorough washing of tomatoes beneath the top layer. The effectiveness of the wash on mesh belts was greatly increased when spray nozzles were installed between the upper and return sides of the belt with the sprays directed against the bottom layer of tomatoes.

An additional important advantage for roller conveyors was that leaves, stems, and decayed tomatoes were driven through the rollers by the sprays. This lessened the task of picking this debris from sorting and trimming belts.

Arrangement of the sprays—The results of N.C.A. studies indicate that a minimum of four banks of sprays are needed. In arrangement of the sprays, a satisfactory distance between spray headers is 12 inches with the nozzles also spaced 12 inches apart on the header.

In the washers studied, each bank of sprays was arranged across the belt at right angles to its length. The position of the nozzles was staggered so that the complete surface of the belt was covered. Such an arrangement gave a total of 14 spray nozzles, two banks with 3 nozzles each and two with 4 nozzles each.

Satisfactory results were obtained with the nozzles 8 to 12 inches above the product. The most desirable height depended on the spray angle and nozzle pressure used.

Direction of the individual spray jets depended on the type of conveyor belt used and whether the impact of the sprays was needed to hold tomatoes on the inclined belt. On mesh belts best results were obtained if one bank of sprays was directed against the forward movement of the tomatoes. This washed a portion of the under surface which otherwise would have been missed by the sprays.

Volume, pressure, and pattern of the sprays—To date, best results have been obtained with a flat jet type nozzle. The spray pattern is fan shaped with sharply defined edges. The water is uniformly distributed with a minimum of atomization. The spray consists of medium sized droplets whose impact on the tomatoes has a good scrubbing action. Excellent results have been obtained with spray nozzles having an orifice of ¼ inch, operated at a pressure of 40 p.s.i. and using approximately 8 to 10 g.p.m. per nozzle.

Temperature of the Water—Warm water (100°F.-130°F.) from can coolers or evaporators used in the final spray wash is about 40 percent more effective in removing soil and bacteria from tomatoes than an equal volume of fresh cold water. Other workers have indicated that fly egg removal is also increased by use of warm water. As yet, there are no results which would warrant the purposeful heating of water for spray washing. However, if clean warm water is being wasted it can be used to advantage in spray washing tomatoes.

SUMMARY OF IMPORTANT POINTS ABOUT TOMATO WASHING

The results of studies and observations on tomato washing are the basis for the following conclusions:

(1) Every effort should be made to prevent crushing of tomatoes at any point before or during the washing operation, since contamination taken into the skin and tissue is not adequately removed by ordinary washing methods.

(2) The heavy bacterial contamination found in field soils on tomatoes indicates that the most important objective in washing is to remove soil from the tomatoes and to prevent soil build-up in washers.

(3) Under constant conditions the extent of removal from tomatoes of soil, microorganisms, and other contaminants is directly related to the volume of water used in washing the tomatoes.

(4) An adequate wash can be given with less water if the application of water to the tomato is made more effective.

(5) The final spray wash is the most important step in the washing operation with the construction of the conveyor belt, and the arrangement, pressure, and pattern of the sprays being important factors.

(6) Use of clean reclaimed water in tomato washing will give results equally as satisfactory as the use of fresh water.

(7) Use of warm water in the final spray wash is approximately 40 percent more effective in removing contaminants than an equal volume of cold water.

(8) Warm reclaimed water can be used in soak tanks and flumes if the water is effectively chlorinated or if the water temperature is controlled at 80°F. or below; otherwise, the growth of spoilage bacteria can be expected.

(9) Recirculation of soak tank or flume water must be carefully controlled to prevent excessive accumulation of soil and organic debris.

The Effect of Post-Cooling Can Handling Equipment on Spoilage Rates

By J. N. Demsey,
Continental Can Company

What effect does post-cooling can handling equipment have on spoilage rates? Are commercially sound cans subject to spoilage because of rough handling and subsequent bacterial recontamination? What might effectively be done to reduce spoilage? These were among the questions Continental Can Company had to face during the 1940's because of increased use of high-speed, automatic handling equipment in canneries. We were most particularly concerned with spoilage that occurred in commercially sound containers that had been properly processed. This presentation is limited to such considerations.

Laboratory tests had demonstrated that rough handling had a pronounced effect on spoilage rates. One test used for measuring the factors involved in spoilage is known as the Bio-Test. This test simulates in an accentuated but well controlled manner those plant conditions that can result in microbial spoilage. The Bio-Test did not, however, give any accurate prediction of the effect individual units associated with an actual operating canning line would have on spoilage. Making a Bio-Test on a commercial canning line appeared to be the simplest way to obtain such information. Accordingly, arrangements were made for use of a seasonal product line during its nonoperating period.

Because it was impractical to make tests on all variables that might in-

fluence excessive recontamination spoilage, field observations and laboratory experience were used to plan studies of factors most likely to be of major importance. A number of such items fell in the category of post-cooling can handling equipment. Our work with the commercial Bio-Test method in the area of post-cooling can handling equipment was in three distinct areas:

(1) The specific effect of individual units of the post-cooling can handling equipment.

(2) The cumulative effect of the post-cooling can handling equipment.

(3) The specific effect of three commercial automatic casers.

The first two parts of this work were done about five years before the third part. The canning lines used differed in some particulars of equipment, but for our purposes they may be considered equivalent. The basic unit equipment used in each line was:

(1) Vacuum closing machine
(2) Vertical retorts
(3) Extra retorts used for cooling
(4) Crate dumper
(5) Unscrambler
(6) Belt elevator
(7) Cable conveyor
(8) Caser

The Bio-Test Method

The "Bio-Test" is about what its name implies, a test of the resistance of containers to biological invasion when exposed to known, exaggerated but controlled conditions. The procedure used for commercial Bio-Test runs made on the line described above was as follows:

The cans were partially filled with 2.5 ounces by volume of blanched (but not soaked) dried Alaska peas and the fill completed with 0.75 percent sugar solution. The sugar solution temperature was maintained at 160°–180°F. and the vacuum closing machine was operating at 14" vacuum. Cans from each crate were code-marked to identify the cans and the test conditions. The cans were processed for 40 minutes at 240°F. in vertical retorts. At the end of the process, the retorts were blown down quickly. The crates were then transferred to vertical retorts containing 400 gallons of water at a temperature between 46° and 56°F. that had been freshly inoculated with a strain of *Aerobacter aerogenes* at counts of about 5,000,000 organisms per ml. Air bubbling through the cooling water assured uniform distribution of the inoculated organisms. Bacterial counts were taken before and after the 30 minute cooling cycle for each lot of inoculated water to assure that no crates were cooled in water showing less than 2,000,000 organisms per ml. after the cans were cooled.

The cooled, wet cans were then run through the selected post-cooling can handling equipment and were cased and set aside. Approximately 3,000 cans were used for each test variable run. All cans used in each commercial Bio-Test were of known good quality manufacture. Top seams were also checked during the run to assure their meeting specifications and not adversely affecting the results. The cans were examined for spoilage as evidenced by the development of pressure within the can sufficient to produce "swells." All cans found spoiled after a 7- to 9-day storage period were examined to be sure that no obvious defect had resulted in leakage, and if such were found they were eliminated from the test.

The bacterial suspensions were prepared from master cultures of *Aerobacter aerogenes* held in the laboratories by gaining active growth of the organisms on 8-ounce agar slants that were then used to inoculate 6-liter containers of sterile pea broth. The 6-liter portions of inoculated pea broth, containing 1 to 2 billion organisms per ml. were strained through a fine wire mesh into the 400 gallons of cooling water. The resultant inoculated cooling water gave counts of about 5,000,000.

Results

When considering the results obtained in such Bio-Test procedures, we must remember one very important point. The Bio-Test was designed to accentuate spoilage under the conditions of study so that significant results could be obtained on relatively small lots of cans. The spoilage rates obtained in the Bio-Test, because of the highly contaminated cooling water, are far in excess of anything that would be expected for this same equipment operating under normal conditions of plant sanitary practice.

All the results discussed in the following were analyzed statistically. Where a significant difference is discussed, analysis showed the variables were or were not significantly different from each other at the 95 percent probability limits.

The Specific Effect of Individual Units

The results of our study on crate dumping are given in Figure I. In

FIGURE I

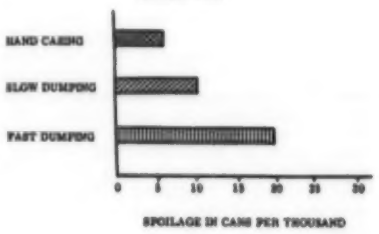
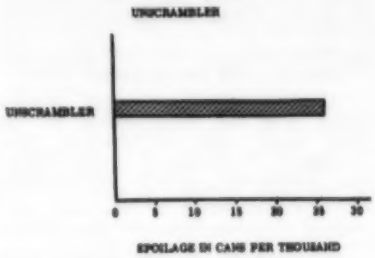


FIGURE II



this test, the fast dumping variable represents dumping of cans from the retort crate onto the unscrambler at about the maximum rate possible in the commercial operation. The slow dumping represented something in the neighborhood of one-fourth the fast dumping rate. The crates were dumped wet and immediately cased by hand from the unscrambler table. The results indicate that fast dumping produces about 20 cans per thousand spoilage, while slow dumping produces 10 cans per thousand spoilage. Analysis of these results shows a significant difference. Since this is one procedure in the automatic can handling equipment that can be controlled by the operator, it is possible that education will help in spoilage reduction.

Figure II gives the results of the test of the unscrambler. The cans were placed by hand while still wet onto the unscrambler and then cased by hand from the take-away track. The indicated 26 cans per thousand spoilage rate obtained in this test was somewhat high for we shall see later that the total cumulative effect of the line was only 21 cans per thousand. One possible explanation for this discrepancy was our difficulty in removing the cans from the take-away track. The unusually rough treatment received because of this difficulty appears to have accentuated the spoilage rates beyond that expected under continuous conditions. The comparison indicates that a continuous, smooth-flowing can handling system is a significant factor in spoilage reduction.

Figure III graphs the results of a comparison of the caser gravity track wherein the pitch of that in-feed track was set variably at 5°, 7½° and 10° pitch. The results indicate that at

FIGURE III

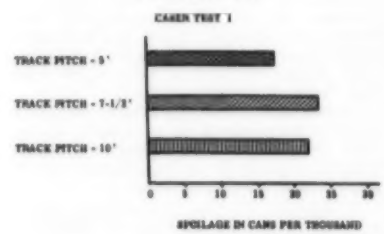
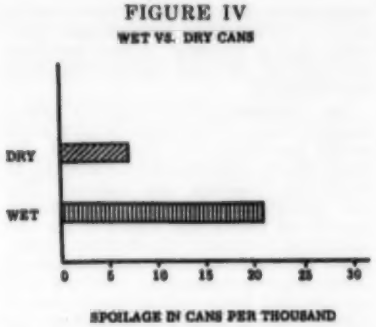


FIGURE IV



the 5° pitch we obtained 18 cans per thousand spoilage; at the 7½° pitch we obtained 23 cans per thousand spoilage; and at the 10° pitch we obtained 22 cans per thousand spoilage. Using the normal operating condition of the 10° pitch as a control, statistical analysis indicates there is no significant difference due to the pitch of this gravity track. The track pitch change was the only one possible that would not have required major engineering changes in the caser unit. Of course, there is a possibility, as in all mechanical equipment, for the machine to be out of adjustment and thus create undue spoilage.

Figure IV gives a comparison of cans run wet and dry through the entire line after cooling in inoculated cooling water. Wet cans run immediately after cooling gave us 21 cans per thousand spoilage while cans dried overnight and run through the entire line the next morning produced only 7 per thousand spoilage. Using the wet cans variable as a control, analysis of the results indicate there is a significant difference between running cans wet or dry. All other things being equal, the drier the cans when going through the line, the less spoilage we should encounter.

In a separate study of the cumulative spoilage effect of the post-cooling can handling equipment, cans were run through the entire line and at various stations in the line, individuals removed the cans and hand-packed them into cases.

The Cumulative Effect

Figure V shows the results of our test studying the cumulative effect of the line. Cans hand-cased directly from the crates produced 6 cans per thousand spoilage. The cans hand-cased immediately after the cans were dumped showed 12 cans per thousand spoilage, while cans that had passed through the unscrambler showed 11 cans per thousand spoilage. After the cans had progressed through the belt conveyor, we found 15 cans per thousand spoilage and 14 cans per thousand spoilage after they had traveled over the subsequent cable conveyor. After they had gone through the caser, we found 21 cans per thousand spoilage. These results appear to indicate the three points in the line, this particular line at least, that cause the most spoilage were the dumper, the belt conveyor and the caser.

FIGURE V

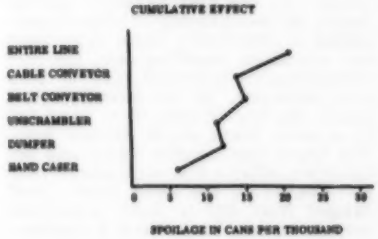
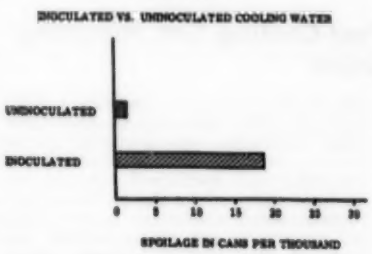


Figure VI represents results obtained in comparing the mean value of all the variables in the program with one variable cooled in fresh uninoculated cooling water. The mean spoilage rate for the inoculated cooling water variables of the entire program to this point was 18 cans per thousand. The cans that were cooled in uninoculated water gave us only 1.3 cans per thousand spoilage. This confirmed previous work showing that high bacterial counts on the cans will increase spoilage.

FIGURE VI



The Specific Effect of Three Automatic Casers

The third phase of our studies on the effect of post-cooling can handling equipment on spoilage rates was carried out some five years after the work discussed up to this time. The interim period found many improvements made to the containers and the post-cooling can handling equipment. It appeared desirable to determine what results would be obtained in a commercial Bio-Test at this later date with these improvements in the picture. By comparison with previous results we could determine if significant improvement in reducing spoilage had been achieved.

One equipment area in which design changes appeared to have made definite improvements in can handling was in the automatic casers. A study of three such commercial units would be possible while checking the general spoilage rate improvement attained in the five-year interval. Accordingly, arrangements were made for three automatic casers to be available for installation on one line. A commercial Bio-Test was run comparing the three units with hand casing. Three thousand cans were utilized in each variable. This Bio-Test was run as previously described. All variables were run over the entire line to the casing station where they were cased by machine or by hand as the test required.

FIGURE VII

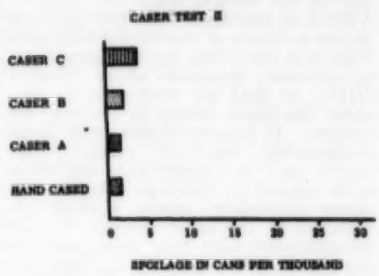


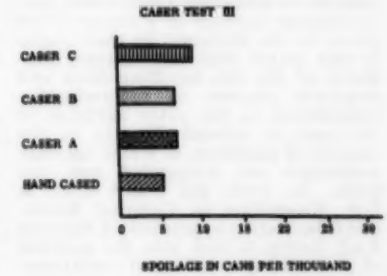
Figure VII presents the results obtained.

While running this last discussed commercial Bio-Test, we felt it would be worthwhile determining the effect that poor top seam structure would have on spoilage rates. The variables listed in Figure VII all represented normal, tight double seam structures which by Continental standards were of normal tightness for commercial open top cans. A second set of variables was run in each of the four caser tests in which the double seamers were adjusted to form a seam definitely rejectable by Continental standards in terms of second operation tightness. These four variables were commercially Bio-Tested in the same manner as the normal seam variables.

The results in Figure VIII show a similar relationship to that noted in Figure VII, but at about 5 to 6 times the spoilage rate. Remembering that these seams were controlled to be rejectable in tightness, we can see that good control of the double seam is an extremely important factor in controlling spoilage rates.

It is to be noted that Caser C gave considerable mechanical trouble be-

FIGURE VIII



cause of improper electrical hook-up during the normal seam run (Figure VII) and the data were not included in the analysis of results for that run. This was corrected for the second set of variables discussed above (Figure VIII), so that we were able to consider the three casers in the over-all results. It was concluded from these commercial Bio-Test results that there was no significant difference with regard to spoilage between the three automatic casers studied attributed to the caser design. It was further concluded that there was no significant difference in spoilage between any of the caser variables and hand casing after the cans have been subjected to automatic can handling equipment prior to casing.

This last point is worth a little more consideration. It means that any equipment in the post-cooling can handling system that handles the cans roughly will develop a large percentage of the total spoilage that might be expected to develop when the cans are to be handled roughly over several successive pieces of equipment. Improvement in one unit of the post-cooling can handling system may be significant yet not give the significant spoilage reduction expected if other poor conditions go unheeded.

It is interesting to note the very apparent improvement in spoilage rates between the commercial Bio-Test runs of the two periods. Cans removed at comparable points in the line showed a spoilage rate of 14 cans per thousand in the early tests (Figure V, cable conveyor) and one can per thousand in the later test (Figure VII, hand cased). The results demonstrate that improvements had been made that significantly reduced the spoilage rates encountered in the post-cooling can handling equipment.

Summary

Commercial Bio-Tests have shown that spoilage rates are increased in post-cooling can handling equipment by:

(1) Rough handling

(2) Contaminated cooling water

(3) Handling cans while wet and contaminated.

We can also conclude that improvements in post-cooling can handling systems make it possible to significantly reduce excessive spoilage rates caused by rough handling of containers in today's continuous high-speed canning operations.

Bacteriological Studies on Post-Cooling Can Handling Equipment

By C. W. Bohrer and J. Yesair, Washington Research Laboratory, National Canners Association

Introduction

At the Technical Sessions of the 1946 Canners Convention, C. L. Smith (1) of the Continental Can Co. reported on the relationship of spoilage to rough handling and contaminated cooling water. He stated that the medium surrounding the can at the time of a critical dent has a tremendous influence on the probability of spoilage resulting from leakage. At the Sessions in 1952, O. G. Braun and W. L. Pletcher (2) of the American Can Co. reported on the influence of post-cooling operations on spoilage by recontamination. The latter paper reported principally the results of qualitative and semi-quantitative bacteriological surveys in 9 tomato juice plants in the Midwest. In their paper it was stated that the sanitary condition of the can handling lines and resultant amount of contamination transferred to the outer surfaces of the cans is related directly to the amount of moisture, in which spoilage organisms are suspended and can grow. In 1956, the N.C.A.-C.M. & S.A. Committee on Canning Equipment Sanitation appointed an Eastern Task Group to look into the problem of post-cooling handling of containers. The Task Group reviewed that matter and concluded that considerable technical knowledge was available on the subject, but that the information had not been well publicized. As an immediate approach to the problem, they recommended additional bacteriological surveys to get an up-to-date picture of the bacterial loads along various can handling lines. The bacteriological information obtained could be used by N.C.A.-C.M. & S.A. Committee in planning whatever future research might be necessary.

Since the Washington Research Laboratory had a program of processing studies in canning plants already arranged for the 1957 season, it was asked to obtain as much of the information desired as possible. As a result, during the past season, a study was made of the post-cooling can handling operations in 7 different factories to determine comparative bacterial contamination. The bacteriological condition of the can handling equipment and the amount of contamination transferred to the double seam area was determined in each factory.

Procedures

The procedures used by the N.C.A. in 1957 were similar to those reported by Braun and Pletcher at the 1952 Convention. Lines handling several products, including peas, green beans, asparagus and tomato juice, were studied rather than tomato juice lines only, and a number of can handling methods of varying complexity were investigated.

An attempt was made to select sample cans at locations where some rough handling was encountered, for example, in unscramblers, rollways to elevators, labelers and casers. The can handling equipment was tested usually at points just ahead of the can sampling locations. In testing equipment the samples for microbiological assay were prepared by rubbing a 6 square inch area with a sterile, moist cotton swab using a template 12 inches long by ½ inch wide. This corresponded roughly to the area traversed by the circumference of a No. 2 can. The cans were tested by rubbing a sterile, moist cotton swab twice around the double seam-body area on the packer's end. The cotton swabs were pre-sterilized in about a half ml. of water in tubes before use. After sampling, the swab was broken off in the tube and 10 ml. of sterile water added for the first dilution. Dilution plate counts were made in tryptone glucose extract agar for the low-acid products and proteose peptone acid agar for the tomato juice studies. Incubation was at 98°F. for 48 hours.

Conditions Studied

The following can handling methods were investigated:

Cans hand cased—cooling water chlorinated.

Cans hand fed to rollway before caser—cooling water chlorinated.

Cans mechanically unscrambled—cooling water chlorinated.

Cans mechanically unscrambled—cooling water not chlorinated.

Cans fed mechanically through an A-B Cooler—cooling water not chlorinated.

Cans handled by Busse System—cooling water chlorinated.

Cans handled by Busse System—cooling water not chlorinated.

Cans handled automatically — can dryer used—cooling water with low bacterial count.

Table 1 shows the comparative numbers of bacteria found on the double seam area of cans at the packer's end under the indicated handling conditions after cooling in chlorinated water. In the first handling method listed, the hand casing of cans of peas cooled in chlorinated water represents the minimum handling and the low contamination indicated may be used as a reference. In the second method listed, the No. 10 cans were hand fed to a caser track about 22 feet long. The track was usually dusty and became wet after a few cans passed over it. Counts on the caser track itself ranged from 500 to 6,000 organisms per six square inches and a substan-

tial number of these were transferred to the can double-seam area.

The third method listed represents mechanical handling by dumping cans on an unscrambler after cooling. A marked increase in seam contamination occurred as the cans passed through the unscrambler. The unscrambler belts were usually wet and counts as high as 160,000 organisms per 6 square inches were obtained.

The fourth method listed employed the hydraulic lift procedure of the Busse System. The major contamination was contributed by the rollway to the caser. Counts as high as 10,000 bacteria per six square inches were obtained on this rollway.

The last method listed consisted of an automatic line with a can dryer incorporated. A comparison of the morning and afternoon results indicates the possibility that contamination increases as operations continue.

Table 2 shows results on handling conditions following cooling in unchlorinated water. The mechanical unscrambling method and the Busse System results with chlorinated water were shown in Table 1 while the Anderson-Barngrover System represents an additional handling method. The results indicate an aggravation of contamination on the Busse System due to the constant supply of contaminated cooling water carried along with the cans and a possible development of organisms on the equipment itself. The double-seam area counts on the mechanical unscrambling method were of the same order for chlorinated and unchlorinated cooling water. On the A-B line, counts as high as 180,000 to 200,000 organisms per six square inches were obtained on the rollway to the elevator and the elevator belt. While some of the counts obtained around the double-seam area at the packer's end might be considered hazardous from a spoilage standpoint, no spoilage was reported by the canners in whose factories the tests were made.

These findings confirm those of Braun and Pletcher and indicate briefly:

(1) Bacterial contamination can develop on wet and dirty post-cooling can handling equipment even though the cooling waters are chlorinated or are naturally of good sanitary quality.

TABLE 1

Comparative Numbers of Bacteria Found on Double Seam Area of Cans under Indicated Handling Conditions

Cans Cooled in Chlorinated Water*

Sampling Point	Hand Cased 303 Cans (peas)	Hand Fed to Caser Track No. 10 Cans (asparagus cuts)	Mechanical Unscrambler 303 Cans (peas)	Busse System 303 Cans (green beans)	Automatic Line 46 Oz. Cans Tomato Juice AM	PM
Cans from crate or cooler	15	165	15	300	22	37
Cans leaving unscrambler			5,000		can dryer	
Cans enter labeler			8,200	300		
Cans entering caser		2,300	1,200	8,000	22	140

* Cooling water counts less than 50/ml.

The numbers of organisms listed were recovered from moist cotton swabs rubbed twice around the double seam area at the packer's end and represent the average of a 2-can sample.

TABLE 2

Comparative Numbers of Bacteria Found on Double Seam Area of Cans under Indicated Handling Conditions

Cans Cooled in Unchlorinated Water*

Sampling Point	Mechanical Unscrambler 8-oz. Cans (peas)	A–B Line 303 Cans (green beans)	Busse System 303 Cans (green beans)
Cans from crate or cooler	300	1,300	2,800
Cans leaving unscrambler	4,000		
Cans top belt elevator		10,000	
Cans enter labeler			2,400
Cans enter caser	1,500	13,000	2,700

* Cooling water counts greater than 10,000/ml.

The numbers of organisms listed were recovered from moist cotton swabs rubbed twice around the double seam area at the packer's end and represent the average of a 2-can sample.

(2) Bacterial contamination is transferred in varying degree to the can double-seam areas as they pass through the handling system.

(3) Post-cooling filled can handling systems are potential contributors to spoilage due to product recontamination.

The information obtained in this study, as well as that obtained in the work just reported by J. N. Demsey of the Continental Can Company, was reported to the Eastern Task Group of the N.C.A.–C.M. & S.A. Committee on Canning Equipment Sanitation on November 6, 1957. The Committee considered the major contributing factors to post-cooling contamination to be moisture on containers, dirty runways and can abuse. More efficient can dryers, improved sanitization of the can handling equipment and decrease in can abuse are approaches showing promise in minimizing spoilage. A statement of principles based on existing information will be drawn up by the Committee to serve as a guide to the canner in considering his post-cooling operations and to equipment manufacturers in designing can handling equipment.

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(2) O. G. Braun and W. L. Pletcher, American Can Company, "Influence of Post-Cooling Operations on Spoilage by Recontamination". Proceedings of the N.C.A. Technical Sessions, N.C.A. Information Letter No. 1871, January 30, 1952.

(3) J. N. Demsey, Continental Can Company, "The Effect of Post-Cooling Can Handling Equipment on Spoilage Rates". Proceedings of the N.C.A. Technical Sessions, N.C.A. Information Letter No. 1666, January 30, 1958.

FISHERY PRODUCTS CONFERENCE

PRESIDING: GEORGE E. STEELE, JR., Director, Fishery Products Division, N.C.A., Washington, D. C.

ADDRESS: "Radioactivity and the Sea Fisheries"—MILNER B. SCHAEFER, Director of Investigations, Inter-American Tropical Tuna Commission, La Jolla, Calif.

ADDRESS: "The 1958 World Conference on the Law of the Sea: Its Significance to the American Fishing Industry"—WILLIAM C. HERRINGTON, Special Assistant to the Under Secretary of State for Fisheries and Wildlife, Washington, D. C.

Radioactivity and the Sea Fisheries

By Milner B. Schaefer, Inter-American Tropical Tuna Commission

You are, I am sure, aware that not many years ago it was discovered that the nuclei of certain isotopes of uranium, and of some other heavy elements, can be made to split into fragments, with the conversion of a very small part of the mass into a very large amount of energy. These nuclear reactions are the basis of a rapidly developing technology for warfare and for peaceful applications. These reactions may be made to proceed in a slow, controlled fashion for the production of materials for nuclear weapons, for the preparation of fuels for power reactors, and in the "burning" of the fuels in the reactors. They may also be made to proceed rapidly, as in the testing of weapons or their use in warfare. In each case, however, there results, along with the yield of energy, the production of the fragments of the original nucleus, which are radioactive isotopes of other elements. The fissioning of a kilogram (2.2 pounds) of uranium 235 yields 24 million kilowatt hours of energy, but it also yields very nearly a kilogram of these highly radioactive waste products.

These waste products create special problems, because they constitute biological hazards in very low concentrations, and because their deleterious properties cannot be eliminated by any chemical treatments; they can be isolated, or they can be dispersed, but they cannot be destroyed. Once they are created, we must live with them until they become inactive by natural decay, which for some of them requires a very long time.

Radioactive isotopes are not something new in this world. Natural radioisotopes exist everywhere — in the soil and rocks, in the houses in which we live, in the food we eat, in our own bodies, and in the ocean. It is interesting to note, however, that one of the remarkable characteristics of the ocean is the very low level of natural radioactivity. Radioactivity in the sea, primarily due to potassium 40, is very much lower than in any other region on earth where life exists.

Three aspects of the atomic energy program are of interest in relation to the sea fisheries: weapons tests over or in the sea; disposal of radioactive wastes from nuclear power plants; and the use of radioisotopes for research, for increasing our understanding of the oceans and the creatures that live in it.

Certain aspects of the nature of the ocean and its contained organisms need to be kept in mind in considering these matters:

The ocean is very large and very deep, covering about 71 percent of the earth's surface, with an average depth of about 4,090 meters. The ocean basins are characteristically bordered by a continental shelf, which slopes gently out to about 200 meters; the bottom then descends much more abruptly to the deep sea floor. The continental shelf averages about 30 miles in width, ranging from almost nothing off mountainous coasts, such as the west coast of South America, to several hundred miles in the China Sea. Some of the deeper parts of the ocean are isolated by high submarine ridges, which restrict exchange of water between adjacent parts.

The waters of the ocean are stratified. There is a relatively thin near-surface layer, varying in thickness in different places, but averaging about 75 meters, within which vertical mixing caused by winds is fairly rapid and complete. Relatively fast wind-driven currents exist in this layer; these are the "surface" currents of the ocean shown on many charts. Here also the horizontal mixing is relatively rapid. This near-surface mixed layer is the region of the sea in which most of man's activity takes place, and from which he removes nearly all of the fishery harvest.

Below the mixed layer is a zone in which the temperature decreases and the density increases rapidly with depth. This thermocline, or pycnocline, separates the near-surface mixed layer from the layers of the intermediate and deeper waters, the latter extending to the bottom. Vertical movement in the intermediate and deep layers is much slower than in the mixed layer, and horizontal currents are more sluggish. Due to the strong density gradient within the intermediate layer, physical exchange between it and the upper mixed layer is greatly retarded over most areas of the ocean.

On the average, several years are required for the replacement of water of the upper, mixed layer from the underlying intermediate layers. However, in some locations, such as areas of upwelling along some coasts, water of intermediate depths comes up into the surface layer rather more rapidly than the average. Exchange between the surface and intermediate layers and the great depths of the ocean is even slower; in the Pacific Ocean, for example, it appears that about 1,000 years is required to replenish the deep water. In such confined basins as the deep basin of the Black Sea, the water remains isolated for even longer periods, of something like 2,500-5,000 years.

Some elements in the sea, including some of the radioisotopes, can, however, be exchanged between the different layers more rapidly than the water, due to their uptake by marine organisms which perform extensive vertical migrations.

The ocean is a concentrated salt solution, containing almost all of the chemical elements. Many of them, however, including some necessary for the growth of plants and animals, are quite scarce. The organisms of the sea are able to select the elements they need, so that those scarce elements that are needed for life are concentrated by large factors in the bodies of the plants and animals. Indeed, in the upper layer of the sea, where plants grow, such elements as phosphorus may be almost completely soaked up from the water in some areas. Certain of the relatively scarce elements, such as strontium, have radioisotopes resulting from nuclear reactions.

You will remember that the animal populations in the sea, as on the land, depend ultimately on the plants for their livelihood. In the open sea these plants are microscopic phytoplankton. The plants can grow only where there

is sunlight for photosynthesis, that is in about the upper 100 meters, or, essentially, in the upper mixed layer. The plant material that is found here may be eaten by animals in the same zone, or may fall out into the deeper layers and be eaten there.

The remains of the plants and animals fall continually out of the surface layer, carrying with them the essential nutritive elements in their bodies. These elements are regenerated by bacterial decomposition in the deeper waters, and are ultimately returned to the upper, sunlit zone by upwelling and other processes, completing the cycle.

The commercial sea fisheries harvest the animals that eat the plants, or animals even higher in the food chain, which, however, ultimately depend on the plants. Most of the commercially important marine organisms are harvested in coastal waters, or offshore waters not very far from land. Several factors are responsible: (1) profitable fisheries can be conducted more easily near ports and markets; (2) the coastal waters are of high fertility, because of greater upwelling and turbulent mixing, and ease of replenishment of plant nutrients from the shallow sea floor; (3) the standing crops of plants and animals attached to or living on the bottom of coastal areas is large, relative to the total organic production.

None of the animals of the great depths are objects of commercial fisheries. Even the truly pelagic, high seas fisheries, such as the great offshore fisheries for tunas, herrings, and whales, harvest animals that live, at least most of the time, in the near-surface layer. Some of these animals, however, do much of their feeding in deeper layers; the sperm whales, for example, feed on squids at great depths. Furthermore, much of the food of commercially harvested organisms consists of small animals, including crustacea, squids and fishes, that make vertical diurnal migrations from several hundred meters to the surface.

We should also bear in mind that the principal means by which artificial radioactivity in the oceans may represent hazards to man are through the marine products, the animals and plants of the sea that are eaten by man and his domestic animals. There are two reasons for this:

First, because a number of the scarce elements in the sea, including some of the radioisotopes created by nuclear reactions, are concentrated, as noted above, by marine organisms by large factors, up to several thousand. Second, because the harmful radiation received from a given quantity of an isotope ingested as food is very much greater than the dose from the same quantity in the external environment. We can be quite certain that the limiting factor on the amount, kind, and location of introduction of radioactive isotopes that can be safely permitted in the sea will be the amounts that consequently appear in the fish and other food from the sea.

"Fallout" from Weapons

To date, the only significant source of man-made radioactivity in the oceans has been the testing of nuclear weapons. There are being introduced small quantities of low-level wastes, incidental to reactor operations, in such places as the Irish Sea, and some small amounts from laboratory wastes elsewhere. These, however, are so small as to constitute no possible hazard except in very localized areas, and within these areas careful control and monitoring have been conducted.

Most of the fallout from weapons tests goes into the ocean. The U.S. and British tests of large weapons have all taken place on offshore oceanic islands; from there, the close-in local fallout, and much of the early (tropospheric) fallout, comes down in a relatively small part of the ocean in the vicinity of the test sites. In addition, the longer-term fallout from the debris injected into the stratosphere from large weapons tests by everyone, including the Russians, which takes several years to come down, and which comes down fairly evenly over the whole northern hemisphere, falls largely on the ocean, because the area of the ocean is greater than that of land.

Some of the fallout on the land is also carried into the sea by land drainage. For example, easily measurable amounts of activity from certain fission products have been found in suspended sediments in coastal waters of southern California following tests in Nevada. Fortunately, fallout onto the open sea is quite rapidly dispersed and diluted. The larger particles of the close-in fallout settle out into the deeper water. The smaller particles, and those which go into solution, are mixed vertically through the upper, mixed layer in a matter of a very few days. At the same time the horizontal currents carry much of the material away from the site, and, by lateral mixing, spread and dilute it over a wide area.

The dilution of the concentration of radioisotopes by the physical processes is such that, despite the propensity of the organisms to soak up some of the isotopes produced, even quite large tests can be safely carried out at properly selected localities. There is, of course, a limit to the amount of radioactive materials that can be safely introduced into the upper layer of the open sea by a weapons test, and this will vary from one place to another, depending on such local characteristics as the direction and rate of transport by the currents, the rates of vertical and horizontal dispersion, the rate of uptake by organisms, and the contiguity of commercial fishing areas. An idea of the order of magnitude in a fairly typical situation is given by the results of weapons tests in the Pacific a few years ago, where the quantity of mixed fission products of the order of half a ton was introduced into the mixed layer in a short time period. That this was near the limit of safety is evidenced by the capture by commercial fisheries in adjacent areas of specimens of tunas and other pelagic fishes with enough radioactivity to be somewhat doubtful for human consumption.

I do not want to minimize the very real hazards which can result in the vicinity of a weapons test over a short time period. The safety of such tests can be assured only if their planning and execution are based on adequate prior study of the oceanographic and biological regime in the area.

The continuing, long-term fallout from the stratosphere of products from large weapons tests, which comes down rather evenly all over the world—at least all over the northern hemisphere where they have been, so far, conducted—is a smaller potential problem in the sea than on the land. This is because this fallout in the sea is stirred quite rapidly throughout the upper mixed layer—some 75 meters or so—while on the land it remains in the upper few inches of the soil. Thus, for equal conditions of fallout, the concentration of isotopes per unit volume is much less in the sea than in the soil from which the land organisms obtain their nutritive elements.

Among the fission products, the most critical is strontium 90, because of its long half life and comparatively long retention in humans. It is chemically similar to calcium, and follows calcium in its metabolism, being mainly deposited in the human skeleton along with the calcium. The important criterion, therefore, is the ratio of radio-strontium to calcium in man's food products. In the sea, calcium is less abundant than in the soil of the land, by a factor of about ten, but, as we have seen above, the radio-strontium from fallout is mixed through a much greater volume in the sea than on land. In consequence, for conditions of equal fallout, the Sr^{90}/Ca ratio in the sea is only about .005 of that in the soil. Taking into account also the biological discrimination factors, we arrive at the interesting result that, for conditions of equal fallout, the Sr^{90}/Ca ratio in pelagic fish is a good deal less than in such calcium-rich terrestrial food products as milk and cheese.

Two other long-lived radioisotopes that may be present in fallout, although they are not fission products, are cobalt 60 and zinc 65. The total amount of these substances produced in weapons tests in very small, but they are extremely highly concentrated by some marine food animals. Cobalt may be concentrated in some

molluscs by factors of several hundred thousand, while zinc is concentrated by fishes by a factor of several thousand over the amount in sea water. Indeed, zinc 65 was the principal radioisotope found in pelagic fish following some Pacific weapons tests. Fortunately, both of these elements pass through the human body rather quickly, so that the permissible concentrations in food are about 25,000 times as large as the permissible amount of strontium 90.

Atomic Waste Disposal

Within the foreseeable future, the problem of disposal of radioactive waste products from nuclear fission in power reactors will greatly overshadow the present problems of radioactive materials from weapons tests. Such waste products are of two kinds: (1) Radioisotopes which are created by irridiation of nonfissionable materials in the reactor, such as in the coolant. These wastes are relatively low in radioactivity and their disposal in the sea, where necessary, creates no particular problem except in coastal waters; (2) Very large amounts of highly radioactive mixed fission products from the reprocessing of "used" reactor fuels.

So far, only some low-level wastes of both categories have been introduced into the sea. Both in the United States and in the United Kingdom, and also, presumably, in Russia, the high-level wastes of the second category have been taken care of by isolation in underground tanks. With the rapid development of the atomic power industry in many parts of the world, this method may not continue to be feasible everywhere, and new means of disposal are being sought. In the United States, it may be possible to isolate very large quantities of these wastes in suitable locations on land. Some other countries, with few suitable land sites, and with long sea coasts, such, for example, as Japan or Italy, may find it desirable, or even necessary, to use the sea for disposal of at least part of these products. Even in the United States, good land disposal sites do not exist in extensive areas of the eastern seaboard and sea disposal may prove to be more economical than transportation to suitable land disposal areas.

With what urgency this problem needs to be considered depends on the degree of optimism concerning the development of this new industry. Currently programmed developments in the United States, United Kingdom, Europe, and Japan will be producing some 40 tons per year of fission products by about 1970. Perhaps an equal amount will be produced in other countries. Forecasts for the more distant future vary widely, but it may not be unreasonable to assume that by the end of the century 10 percent of the world energy consumption will come from this source, and that the world energy consumption will be about 2.7 times the present (based on the present rate of increase of energy use). This would correspond to about 1000 tons of fission products per year. Accumulation, year after year, of production would eventually result in a constant quantity of radioactivity, such that the rate of radioactive decay will balance the rate of production. This equilibrium would be approached in a few decades, and, at a level of production of 1,000 tons of fission products per year, would amount to 7.7×10^8 megacuries of radiation, or about 1.6 times the total natural radioactivity of the oceans.

This estimate may be conservative, because there is reason to believe that,

MILNER B. SCHAEFER

barring a major war, energy consumption in the future is going to increase more rapidly than the present rate, and by the year 2000 the energy derived from uranium and thorium may represent one third of the total. If so, we may have to deal with some 6,000 tons of fission products per year, corresponding, at equilibrium, to nearly 10 times the total natural radioactivity in the oceans.

On the other hand, development of power sources from controlled fusion of nuclei of hydrogen or other light elements, which may be commercially feasible within the next 30 years, would ameliorate the problem, because these reactions do not produce large quantities of radioactive waste products. It is doubtful, however, that this development will eliminate the problem of waste fission products, for two reason: (1) The commercial development of fusion power may involve the employment of a uranium "blanket" in the power producing device; (2) New sources of power seldom completely replace older sources; fission reactors will almost certainly continue to be used for many purposes.

Just what share of these waste products can safely be placed in the sea in selected localities cannot be stated with any exactness at this time, because we simply do not know enough about the various physical, chemical, and biological processes to provide a basis for good engineering estimates. We do, however, know enough about the sea and its organisms to make rough evaluations of the effects of disposal of fission products in different parts of the sea. Because of limitations of knowledge, such evaluations must, necessarily, be conservative.

In disposing of radioactive materials in the sea, we may take advantage of two possibilities: (1) isolation of the materials, so that their entry into the part of the sea and its contents used by man is limited, and time is allowed for radioactive decay, and (2) dispersion and dilution of the materials that do enter the domain used by man, to keep the concentrations of the radioisotopes at tolerable levels. Depending on the quantity of materials to be dealt with, we may aim at either or both of these possibilities.

Coastal Waters

Radioactive materials introduced into coastal waters enter directly into the part of the ocean most utilized by man, and from which he takes the greater share of the harvest of marine food organisms. The sessile plants, bottom living invertebrates, and fishes of these waters heavily concentrate some elements, such as strontium, cerium, zinc and cobalt, that have radioactive isotopes hazardous to man. Dispersion due to physical transport and mixing in these waters is high, but they are shallow, so that the volume is limited. There can also be considerable accumulation in the bottom sediments from which the isotopes can again be taken up by man's food organisms. In some coastal areas, the combination of physical and biological processes can also result in local concentrations of radioactivity in the waters themselves.

Because of these considerations, the quantity of radioactive materials that can be introduced safely into a locality in coastal waters near shore is very limited, of the order of a few hundred curies per day. The various physical, chemical, and biological factors are so variable from one area to another that careful study is required to determine safe amounts in any particular place, and continuous monitoring is required.

The rather low quantity of radioactive products that can be tolerated in coastal waters also makes it necessary to provide adequate safeguards against discharge of high-level atomic wastes from accidents to power reactors, either at locations on the shore or shipborne reactors.

Offshore Near-Surface Waters

The quantities of radioactive material that can safely be placed in the upper mixed layer in the open sea depends on such local characteristics as the direction and velocity of currents, the rates of horizontal dispersion, the rate of uptake by organisms, and the nearness of commercial fishing areas. In general, however, permissible quantities will be much greater than in coastal areas. As we have noted above, something like half a ton of fission products over a short time period seems to be not far below the limit of safety in one fairly typical situation in the mid-Pacific. Certainly the quantities which can be safely introduced anywhere in the upper, mixed layer of the oceans are a good deal less than the expected production from the world's power reactors within the next few decades.

Waters of the Deep Ocean

The only place in the ocean in which we can be confident at this time that radioactive wastes of the order of some tons per year can safely be deposited is in the depth of the sea. Present knowledge is, however, inadequate to determine whether the quantities expected to be produced by power reactors in the next few decades can be disposed of in this way.

Radioactive materials placed in the deep sea will be partially isolated from the upper layer for the time periods related to the residence time of the water in the deep layers. During this time there will be a decrease of activity due to decay, and dilution due to dispersion. Since the residence times are variable in different depths and locations, a much greater time of isolation will be obtained in some places than others. The longest time of isolation will be obtained in deep, nearly enclosed basins such as the Black Sea.

A great deal of consideration has been given to this matter by scientists in the United States and in other countries in the last few years. Taking into consideration all of the current knowledge about the ocean and its organisms, we arrive at the conclusion that it is not certain whether or not reactor fuel wastes of the order of 1,000 tons per year can be disposed of in the deep sea.

On the other hand, calculations based on very conservative assumptions about the mixing processes have shown that it will certainly be safe to employ quantities up to several tons a year in careful experimental studies, on the basis of which more precise estimates can be made.

What We Need To Know

If the possibility of disposal of any large quantities of fission products in the sea is going to be seriously considered, a very great deal of effort will have to be put into scientific research on the sea and its organisms. Our knowledge of most of the processes in the oceans is altogether too fragmentary to permit precise predictions of the results of the introduction of radioactive materials at any particular place. Obtaining the required knowledge will require an adequate, long-range program of research on the physics, chemistry, and geology of the sea, and on the biology and ecology of its contained organisms. Such research will have to be directed toward the understanding of general principles, not simply to quick solutions of particular local problems for immediate application. The latter sort of study is, of course, necessary for providing engineering solutions to particular, immediate problems, but such solutions must necessarily be of limited application, and will always be extremely conservative until we obtain sufficient broad understanding.

Some of the major basic problems requiring investigation have recently been discussed in a report by the National Academy of Sciences—National Research Council Committee on Effects of Atomic Radiations in Oceanography and Fisheries. Without attempting here to discuss these in detail, I may simply list the major headings:

(1) Dispersion in the upper, mixed layer.

(2) Circulation in the intermediate and deep layers.

(3) Exchange between the surface layer and deeper layers.

(4) Sedimentation processes.

(5) Effects of the biosphere on the distribution and circulation of elements.

(6) Uptake and retention of elements by organisms used as food for man.

(7) Effects of atomic radiations on populations of marine organisms.

Much of the required research can be accomplished by the extensive and intensive application of classical oceanographic techniques in physics, chemistry, geology, and biology. In addition, however, the availability of large quantities of radioisotopes provides a powerful new method, which is particularly valuable for studying processes in the sea. The use of radioactive elements as tracers permits the paths of various elements, both in the physical environment and within the biosphere, to be determined, and the fluxes of elements through various parts of the system to be measured.

Tracer techniques are valuable both in the laboratory and in field studies. They have already been used extensively in the laboratory and in small-scale field experiments. Valuable information has been obtained from the tracers introduced into the sea by weapons tests. It is believed that an additional very profitable approach, which has not been employed, is the use of fairly large quantities of radioisotopes to study various processes in the open sea in a planned fashion.

It is to be noted that much of the basic research needed for evaluating possibilities of atomic waste disposal in the sea is identical with research required for evaluating and improving the harvest of the sea fisheries. The flux of materials through the biosphere is the fundamental process underlying the fishery harvest. Fishing, essentially, consists of man intervening to remove some of the material at a suitable point in the system. Elucidation of the properties of the system will provide much of the scientific basis for the optimum exploitation and conservation of the sea's living resources.

Action Required

It is not possible to indicate at this time the detailed requirements of men, ships and other facilities needed for an adequate attack on these problems. However, the problems include some of the most difficult in the marine sciences, and will require much more knowledge about the sea and its contents than has been obtained since the beginning of modern oceanography some 70 years ago. I, personally, would estimate that current oceanographic research efforts will have to be at least doubled to provide the information required within the next two decades. Because of the world-wide nature of the problems, this large expansion of marine scientific effort needs to be developed not only by the United States but by other nations as well.

As far as the United States is concerned, it is pertinent to note that the present budgets of the various non-governmental oceanographic laboratories amount to something like $10 million a year. Doubling this rate of support is probably feasible only over a period of a few years, because competent researchers for immediate expansion of this field are simply not available. It is possible, however, that such an expansion could be accomplished over a period of perhaps five years. For the immediate future, it should be possible efficiently to bring to bear a research program on the most important of the tasks in at least some areas of the sea, if funds are made available for the purpose.

As you are aware, a number of different agencies of the federal government are concerned in one way or another with the development and application of atomic energy, and with the matter of disposal of the waste products therefrom. Furthermore, these are matters of international concern, particularly insofar as the high seas are involved. For these reasons, and also because of the large scope of the scientific effort required, it is very important that both the research and its engineering applications be well coordinated on both the national and international levels. The

Committee of the National Academy of Sciences has, along these lines, recommended, among other things, the following:

" . . . in future weapons tests there should be a serious effort to obtain the maximum purely scientific information about the ocean, the atmosphere, and marine organisms. This requires, in our opinion, the following steps: (1) In the planning stage committees of disinterested scientists should be consulted and their recommendations followed, (2) Funds should be made available for scientific studies unrelated to the character of the weapons themselves, and (3) The recommended scientific program should be supported and carried out independently of the military program rather than on a 'not to interfere' basis. . . .

"Sea disposal of radioactive waste materials, if carried out in a limited, experimental, controlled fashion, can provide some of the information required to elucidate the possibilities of, and limitations on, this method of disposal. Very careful regulation and evaluation of such operations will, however, be required. We, therefore, recommend that a national agency, with adequate authority, financial support, and technical staff, regulate and maintain records of such disposal, and that continuing scientific and engineering studies be made of the resulting effects in the sea.

" . . . (1) that cognizant international agencies formulate as soon as possible conventions for the safe disposal of atomic wastes at sea, based on existing scientific knowledge; and (2) that the nations be urged to collaborate in studies of the oceans and their contained organisms, with the objective of developing comparatively safe means of oceanic disposal of the very large quantities of radioactive wastes that may be expected in the future."

Dr. C. Olin Ball Receives Forty-Niners Service Award

Dr. C. Olin Ball, well-known authority on food technology and presently a professor and research specialist at Rutgers University, was presented the fifth annual Forty-Niners Service Award in special ceremonies January 18.

The Award recognizes his over-all contribution to the canning and allied industries and his special activity in thermal processing.

David S. Nay, president of The Forty-Niners, presided at the presentation ceremonies. Roger H. Lueck, research director of American Can Company, lauded Dr. Ball's scientific contributions, and Professor Walter A. Maclinn of Rutgers spoke on Dr. Ball as a teacher.

Top leaders of the canning and allied industries were present as guests of The Forty-Niners at the award ceremony and reception which followed, honoring Dr. Ball.

Previous Award recipients were Dr. Samuel Cate Prescott, Massachusetts Institute of Technology, 1954; Dr. John Charles Walker, plant pathologist, University of Wisconsin, 1955; Dr. Louis Gardner MacDowell, director of research department, Florida Citrus Commission, 1956; and Carlos Campbell, Executive Secretary of N.C.A., 1957.

The Forty-Niners

The Forty-Niners is a service group organized in 1949 to assist the Canning Machinery and Supplies Association and other canning industry groups. It was established by 45 men whose firms were members of the C.M.&S.A. Their first assignment, which they assumed for themselves at the time of their organization, was to usher at the C.M.&S.A. Musicale at the 1949 Convention in Atlantic City. Since then they have assisted at many public events at canning industry meetings, serving the N.C.A. and the state and regional canners associations as well, in keeping with their objective of promoting high standards in the conduct of all canning industry affairs.

The Forty-Niners assisted at the 1958 Convention at the Old Guard Party, the C.M.&S.A. Sunday Night Show, the Young Guard Party, the N.C.A. Banquet, and the C.M.&S.A. Dinner Dance.

Officers Elected by Other Associations

Officers of other trade associations elected at their annual meetings during the Convention period:

Canning Machinery and Supplies Association

President—John C. Swift, White Cap Company, a subsidiary of Continental Can Co., Inc., Chicago; vice president—William E. Vaughn, American Can Co., New York City; secretary-treasurer—W. D. Lewis, Washington, D. C. (continued in office); ex officio—C. K. Wilson, Food Machinery & Chemical Corp., San Jose, Calif.

The Forty-Niners

President—Frank S. Langsenkamp, F. H. Langsenkamp Company, Indianapolis; vice president—Edward E. Judge, *The Canning Trade*, Baltimore, Md.; secretary-treasurer—Charles E. Schick, Waukesha Foundry Co., Waukesha, Wis.

National Preservers Association

President—Joseph A. Raphael, Louis Sherry Preserves, Inc., Long Island City, N. Y.; vice presidents—John S. Phillips, Puritan Preserve Company, San Francisco; J. N. Major, Jr., Old Virginia Packing Co., Inc., Front Royal, Va.; and Francis Oelerich, Oelerich & Berry Co., Chicago; secretary-treasurer—John C. Fosgate, Chester C. Fosgate Co., Orlando, Fla. (reelected); and executive vice president—Richard F. Curry, Washington, D. C. (continued in office).

Old Guard Society

President—Sidney B. Cutright, The Illinois Canning Co., Hoopeston, Ill.; first vice president—Nicholas J. Janson, Nicholas J. Janson Co., Cincinnati; second vice president—Robert L. Eirich, H. S. Crocker Co., Inc., Baltimore; secretary-treasurer—John Dingee, Haddonfield, N. J. (reelected).

Young Guard Society

President—George H. Horsley, The Horsley Co., Ogden, Utah; first vice president—Ty Young, Charles G. Summers, Jr., Inc., New Freedom, Pa.; second vice president—Jerry L. Pearson, Dan Joseph Co., Columbus, Ga.; third vice president—R. B. Connelly, American Can Co., Indianapolis; secretary-treasurer—Herb Shek, H. S. Crocker Co., Inc., Baltimore, Md. (reelected); recording secretary—Arthur Judge, Jr., *The Canning Trade*, Baltimore, Md. (reelected).

Association of Canners State and Regional Secretaries

President—Jack R. Grey, Pennsylvania Canners Association, York, Pa.; vice president—R. J. Marsh, Canners League of California, San Francisco, Calif.; secretary-treasurer—Guy E. Pollock, Iowa-Nebraska Canners Association, Marshalltown, Iowa.

Sputniks, Science, and Survival

(at the Board of Directors Meeting)

By H. Thomas Austern,
Chief Counsel,
National Canners Association

On October 4, 1957, in the lower reaches of the Caucasian Mountains, a huge three-stage Russian rocket was fired, and successfully put into an orbit around the earth a man-made satellite weighing almost 200 pounds.

History may ultimately record that launching as a major turning point in this troublesome Twentieth Century, whose first five decades have already brought two world wars, the break-up of the British Empire, an economic depression that affected every country, the rise of communism, the release of atomic power, and advances in technology and communications that have dramatically changed the lives of every one of us.

Even at close range, during the few months in which the two Russian satellites have been circling the earth, the impact of their radio beeping has been spectacular.

A new word. "Sputnik," has entered the English language—and perhaps many other tongues. Sputnik already has come to mean more than satellite. The word has become freighted with a host of collateral meanings — and apprehensions, recriminations, and hopes.

Indeed, it has given a nickname to the second session of the 85th Congress—now often dubbed the Sputnik Congress.

Moreover, many in and out of government fear that because of these Sputniks the prestige of the United States throughout the world has greatly suffered. Those who hold this view have not been comforted by an unfortunately publicized and humiliating American failure to duplicate, even on a minor scale, what most objective men concede was a notable scientific achievement by the Russians. Nor is their chagrin in any way minimized by the long history of ridicule of Russian technology, and of previous Soviet propaganda claims that they invented everything from the telephone to the harvester combine.

Here at home there has been a consequent series of re-evaluations, and by now many deep-rooted apprehensions about our defense program, about the internal organization and interservice dissensions in our armed forces, about our foreign policy, and about our basic educational methods.

For a nation that has spent more than $400 billions on defense in the last 10 years, a nation that had come to believe that its armed forces were an effective defensive shield for the entire free world, a land that has always prided itself on its system of universal education and had supposedly enlisted worldwide faith in the superiority of American scientific achievements and productive skills, these doubts are hard to take.

Many believe that the forceful jolt to American complacency—and the hoped-for vigorous response to that blow—may have effects that in the long run will prove enduring.

Nevertheless, each day must be lived as it dawns and the tasks it demands performed as they come. As President Eisenhower said last week, a free economy in a free nation reflects "the independent judgments of millions of people." Its military strength rests largely on its economic vigor. That does not mean that we can accomplish things merely by appropriating money for them. But it does mean, in the President's words, that the productivity and the adaptibility "of the American economy is the solid foundation stone of our security structure."

In that economy the food industry is necessarily an important part—indeed it absorbs the major portion of direct consumer spending. Yet inescapably the economic vigor of the food industry mirrors what is going on in the entire economy, in terms of business activity, employment levels, and consumer purchasing power.

Let us, therefore, look briefly at the American economic picture as it has developed over the past few months — while the two Sputniks circled over us, north and south, several times each day.

Of course, we live by the clock and by the calendar. We can measure progress by the day, the month, or the conventional calendar year.

If you examine 1957 on a 12-month basis, the picture is good, perhaps deceptively so.

Gross national product, the market value of all goods and services, increased during 1957 to $435 billion, some $20 billion, or about 5 percent, above 1956.

Personal income increased $16 billion, or again by 5 percent. Disposable income, wages and salaries, and consumer spending each increased about 5 percent in dollar volume over 1956.

Of key interest was the record 1957 rate of new investment, rising to a total of about $37 billion, or 6 percent more than it had been in 1956.

And equally striking—and provocative—was the increase in federal and state government spending. These rose to nearly $87 billion, or an increase of 8 percent.

Simple arithmetic reveals that one-fifth of our economic activity derived from government spending.

Of course, these 1957 advances in gross national product, personal income, wages and spending, are measured in dollars. A very substantial part of the increase flowed from higher prices. Yet even so, when the necessary price adjustments are made, 1957 as a whole was a record year in over-all economic activity.

But when you break down this recent economic history by calendar quarters, a somewhat troublesome pattern can be discerned. For the first three calendar quarters of 1957, business was excellent. The seasonally adjusted gross national product was $4 billion higher than the eventual yearly average.

But by the late summer, the trend changed. Many commodity prices declined. Inventories were severely contracted. Profit margins were dramatically curtailed. The stock market, which to some degree reflects future prospects, dropped substantially and over-all cancelled the gains of the last two years.

Unemployment became marked and is apparently continuing upward. Plans for future investment have been substantially reduced.

Some people have suggested that the reversal in the last part of 1957 is attributable to tight money and higher interest rates. It is true that the Federal Reserve Board in August, for the seventh time in three years, raised the re-discount rate. It did so at a time when it feared inflation. On what we now know about the loss in business momentum, that step may have been untimely, if not unwise. In November, the Federal Reserve Board reversed itself and reduced the re-discount rate. For the immediate future, you can anticipate somewhat easier money at lower interest rates.

[NOTE: On January 21, three days after Mr. Austern's address, the Federal Reserve Bank of Philadelphia reduced its re-discount rate from 3 to 2¾ percent.]

Yet though everyone must agree that the last few months have seen a slowing in business, neither broad statistics nor the particular situation in a specific industry can give definite answers as to the future. The economy is not on a toboggan because steel production fell below 70 percent in December or because 100,000 automobile workers were recently laid off. Nor has the future now become rosy simply because the Christmas retail sales equaled those of last year.

I mention those two details because in recent talks with some topflight business economists I have found that they believe that the psychological factors are sometimes far more important than economic data. In other words, what may happen in 1958 might well turn upon whether the American businessman will continue to have confidence in the future, or will instead fearfully retreat to an economic bomb-shelter in which he makes no further investments, avoids all future commitments, operates on a bare-bones inventory, and takes no risks.

Long range, some trends appear valid. We have since 1945 perhaps caught up with the 12-year backlog in demand—for new homes, furniture, electrical appliances, for automobiles, and for needed new industrial plants. There are no longer many commodities in short supply. There are no marked labor shortages. Dramatic increases in national production may not be in the cards for the immediate future.

Nevertheless, large segments of the vastly augmented American population are now on a new, higher standard of living. They will continue to buy to satisfy that standard. Above all, they will continue to eat, and to purchase the wide range of food products they have learned to enjoy. That basic current demand will continue so long as purchasing power is reasonably sustained.

Many people, including those in the Administration, confidently look for a general pick-up in business late this spring. Most economists suggest that a business upturn could readily be sparked by increased defense spending—which brings us to the Federal Budget presented to Congress last Monday.

No detailed analysis of President Eisenhower's proposed Budget is necessary, largely because what a Democratic Congress will do with it in an election year—and in response to a widespread feeling of national crisis—cannot be foretold.

As offered, it is the highest peacetime Federal Budget ever proposed. It totals almost $74 billions.

It offers no possibility of tax reductions. True, a surplus of $500 millions is estimated. But this is far less than 1 percent of the monumental sums involved, and could readily disappear, particularly if the optimistically estimated tax receipts are not realized, or if Congress insists on giving the economy a shot in the arm by minor tax changes.

You can find a whole platoon of people who insist that the Federal Government will go far into the red both this year and next.

By and large in the Budget, the general government expenses are slightly increased. Only the requested appropriation for agriculture is lower than the expenditures for the two preceding fiscal years.

Most intriguing, in the light of the present situation, is the amount asked for national security. It aggregates 62 percent of the total Budget.

You will recall that in his hard-hitting State of the Union Message, the President asked for a supplemental defense appropriation for the present fiscal year of $1½ billion. He wanted this for

"increased expenditures for missiles, nuclear ships, atomic energy, research and development, science and education, a special contingency fund to deal with possible new technological discoveries and increases in pay and incentives to obtain and retain competent manpower."

The net effect would be to make the over-all Budget for the present fiscal year 1958 about $4 billion greater than it was two years ago.

Military spending, however, does not immediately follow authorization and appropriation of the money. There is always a considerable lag, and in recent years an occasional administrative cut-back.

Forgetting the technical differences between authorization and appropriation, and looking at the actual expenditures, the new Budget provides for spending about $1 billion more for defense in the next fiscal year than will have been spent up to July, 1958, when the new fiscal year begins.

In other words, the President has proposed an increase of a little over 2 percent in direct defense spending beginning next July. To accomplish this, conventional military expenditures may be cut back, and the bulk of the savings and of the new money devoted to missiles and new weapons. The key question is whether Congress will be satisfied either with the proposed amount to be spent or with the proposed rate of expenditure.

For inescapably, many verbal rockets will be detonated on Capitol Hill on these questions of defense. And not all of the agitation will be politically oriented. The recent Rockefeller Report, and the leaks from the still top-secret Gaither Report, have left many people deeply concerned about both the present adequacy and the future vulnerability of American defense.

In his recent Message, President Eisenhower did not evade those issues. He condemned jurisdictional quarrels and rivalries in the armed services. Whatever they are, he insists America wants them stopped. The first objective of his 8-point program embraced measures to end interservice rivalries by executive action and by requested new legislation.

Whether Congress will be satisfied with these assurances—whether it will insist that what has been going on must be ventilated in public hearings—whether it will take the bit in its teeth and enact drastic statutory changes—are questions that will command and absorb major public interest during the coming months.

By the same token, there will be no opposition, partisan or otherwise, to the President's second point—the needed acceleration of the American defense effort. Here the area of argument will be whether enough is being done and done quickly.

In his Message, the President also strongly stressed that military strength alone is insufficient, but must be accompanied by continued and fairly massive economic assistance to our allies. You may remember that Congress did not see eye to eye with him on that point last year, and cut the foreign aid appropriation. The Budget presented last Monday proposes a slight increase in mutual assistance.

In the same area lies his proposal for a five-year extension of the Reciprocal Trade Agreements Act. Declining business prospects in many lines have raised new fears of foreign imports. There is a growing antipathy to negotiated tariff reductions. In no other area does the interplay of local pressures have equal political impact. At least one segment of the canning industry is strongly opposed to any tariff concessions, and is instead seeking quotas on competitive imports. Here again prolonged and polemic controversy in Congress can be anticipated.

The final Presidential request in the foreign field is his plea for legislation permitting the exchange of scientific information with other countries, principally Great Britain. This issue raises at least two fundamental problems. The first is that the secrecy restrictions derived originally from the proposition that the United States was in many scientific fields, particularly atomic energy, much further advanced than other nations. There is considerable doubt whether this is still true. The second problem is the fear, underscored by some notorious episodes, that secret information given to other countries might be revealed by some of their citizens. The chances are that Congress will conclude, as many believe, that we have more to gain than we might lose by exchanging scientific information.

In an election year you can also be certain that Congress will also concern itself with our domestic problems, some of which are of vital interest to the canning industry.

Paramount perhaps is agriculture. In 1957 American farmers got more than $600 million for putting 21.3 million acres into the Soil Bank. Nevertheless, total crop production matched that of the record years of 1948 and 1956. And this increased farm production occurred even though, since 1950, more than a million people a year have left the farms.

Secretary Benson has asked Congress to scrap the acreage reserve part of the Soil Bank program at the end of 1958. He will try, but probably fail, to get authority to lower support prices in the face of surpluses. Admittedly, the Federal Government will have to go on buying wheat, corn, rice, dairy products, cotton, and other farm commodities. Once again almost $5 billion in federal funds will be spent for agricultural aid.

In an election year, Congress can hardly be expected even to entertain

Secretary Benson's basic suggestion that the only hope for any realistic or lasting solution to the agricultural surplus problem is to reduce the number of marginal farms. Whatever may be the economic validity of that suggestion, there is little likelihood of any extensive changes in basic farm legislation in the next session of Congress. You can expect much discussion, the endless hearings, the customary arguments and disagreements, but in all likelihood no fundamental change in farm legislation.

On other domestic fronts, Congress still has before it all of the legislative proposals introduced last year. These include the proposal to strengthen the antitrust law prohibition against competitively injurious mergers by requiring prior notice before they are consummated, and the perennial proposal to amend the Robinson-Patman Act by limiting the defense of a lower price given to meet competition.

Some form of amendment to the Federal Food, Drug, and Cosmetic Act may finally be enacted to control the use of chemical additives.

On the wage and hour front, there are pending proposals to increase coverage and to curtail overtime exemptions as well as to increase the minimum hourly rate. Few expect that these will pass.

Technical amendments to the tax laws, with possibly some revision of depreciation rates, will be strongly pushed.

All of these measures have been pending, debated, and considered for many years.

You may also recall that in 1957 a Senate Committee devoted a lot of time to exposing evils in the operation of the trade unions and in the handling of union funds. But do not expect drastic legislation in this field. There may be some federal controls of union funds, but in an election year it is a safe bet that drastic curbs on union activities and conduct will not be enacted.

In like fashion, the hundred or so federal bureaus and agencies will continue to function. The Federal Trade Commission has established a new record in the issuance of complaints, and there has been a renewed flurry of complaints charging violation in the payment of unlawful brokerage. The Commission recently held that it is unlawful for a canner and his broker to agree on a lower commission if it becomes necessary for the canner to permit his broker to reduce the price in order to meet competition in a particular market. The Commission held that the net effect of doing so is that the broker was splitting his usual brokerage with the buyer.

With its increased funds, the Food and Drug Administration has stepped up its enforcement, particularly in the area of adulteration based on insanitary plant conditions and in the field of economic misbranding. A continued program for the establishment of food standards is expected to be pursued.

I suppose that these routine operations of our vast and multi-billion dollar government have become commonplace. Even burdensome bureaucracy can become familiar and, however disliked, can be borne. Its scope, its cost, and its daily developments are no longer considered striking—and are left to the Association staff to worry about.

But what is novel on the national scene over the last four months is the new emphasis on scientific research

H. THOMAS AUSTERN

and the awakened interest in education.

Within a month of Sputnik, the President told the nation that

"one of our greatest, and most glaring deficiencies is the failure of us in this country to give high enough priority to scientific education and to the place of science in our national life . . . a second critical need is that of giving higher priority, both public and private, to basic research."

These ideas were echoed in further talks, in the press, in public discussion, and in action. Federally employed scientists are scheduled to get substantial salary increases. The Defense Department is emphasizing scientific research. And, the sixth point in the President's program is the application over the next four years of a billion dollars in federal aid to stimulate scientific education—by research grants, by scholarships, by improved teaching, and wider student opportunities.

In this area, I suggest, the canning industry and this Association are well ahead of the parade. The relationship between basic research and dynamic growth was recognized more than 40 years ago.

In the canning industry, there has always been encouragement and funds for the fellow who wanted to learn why grass is green and fried potatoes turn brown.

We are not immodest in remembering that this Association was founded on scientific research, that its members have never shared the general public disinterest in or distrust of the scientist, and that the research laboratories of the Association, of its member canners, and of many suppliers, have turned in an astounding record of basic scientific contributions to the industry and the American consumer.

Some of those contributions ought never be forgotten. Dissipation of the myth of botulism in commercially canned foods, that early threatened the entire industry, rested on hard laboratory effort. The Association processing manuals, used throughout the industry, were grounded on basic research in heat penetration, into the resistance of spoilage organisms, and into the methods for calculating processing time from these basic data.

It was the intensive work of the N.C.A. laboratory staff that forestalled the premature and possibly hazardous introduction of some antibiotics into canned foods, as a substitute for full processing, and thereby saved the industry from embarrassing and costly mistakes.

Most of you are also familiar with the research work that has yielded control of flat sours, bacterial standards for sugar, in-plant chlorination with better and less costly plant sanitation, as well as methods for the detection and control of pesticide residues.

Every informed canner knows about, and has used, the splendid results of the joint N.C.A.-C.M.I. basic research into the nutritional values of canned foods—their vitamin, mineral, protein and carbohydrate content—and how these are now effectively retained in modern processing.

Both the government and the industry are indebted to the 1955 joint research efforts in Nevada to determine the effect of a nuclear explosion on canned foods—a project that involved the exposure of 25,000 samples to an atomic blast.

I cannot even briefly recount more than a half-century of constant laboratory effort by devoted research workers. But in this canning industry emphasis on scientific research, there have developed through the years three characteristics that perhaps offer helpful guidance to the general public.

In the first place, it has been *basic* research. It has sought a solid background of fundamental knowledge, perhaps of no immediate application,

but against which new problems could be anticipated and solved. There has been continuous effort—not an intermittent series of scrambles to catch up in order to survive. And the process continues apace: At the moment fundamental research in enzymatic action and chemistry is going on that may well soon offer new insights into color and flavor retention in canned foods.

Secondly, the canning industry and the Association laboratories have not assumed that they had a monopoly of brains and knowledge. They have always sought the interested cooperation of others—in the universities to which research grants have been made, in the land grant colleges and extension services, in the laboratories of suppliers, in government, and in scientific institutions not directly connected with the industry. There have been no rivalries, no dissensions, and no self-aggrandizement in canning industry research.

Finally, the fruits of what has been discovered have been made available to all. Even more, the basic emphasis has been on education—on stimulating the interest of the young in the sciences of horticulture, processing, and food preparation. No other industry has offered more prizes, grants, or materials to educational institutions — whether in the form of research grants in bacteriology, the organization of contests among the Junior Vegetable Growers and in the Farm Youth Program, or the distribution of basic teaching materials for the study of home economics.

In no small measure have these policies proved their worth, not merely in constantly increasing the per capita use of canned foods, but more importantly in the development of a more varied and healthful diet for the American people.

But on the broader front, and looking at the country as a whole, the intriguing question is whether this awakened American interest in scientific research, this new respect for the pure scientist, and this awareness of the role of education will endure and work any fundamental change in American thinking.

We have the money to increase teachers' salaries, to give scholarships, to make research grants, and to insure that every talented child can get advanced training. As the Rockefeller Report put it, we can afford to survive.

But many ask whether these Sputnik inspired changes will go further. Will we stop thinking about the scientist as a long-haired, pipe-smoking, odd and impractical fellow who probably has radical notions? Will we continue to regard the school teacher as one who probably could not have succeeded in business—and obviously could never have met a payroll? Will we make it clear that the research worker is to be as honored and as well paid, and considered as normal a human being as the factory manager or the advertising copy writer?

Even if we do, the problems of the next decade still will command the talents and energies of all of our American skills — research, production, and political.

Albert Einstein once remarked that politics are far more difficult than physics, and that the world is more apt to be destroyed by bad politics than by bad science. A little horse-sense is always a necessary condiment in the digestion and use of any scientific discovery.

So even if the scientific egghead is to come into his own—even if the charge that Americans are anti-intellectual is to be forever dissipated —we will still require the production genius—we must continue to have those management skills and judgments that Ed Brown has so often stressed—and we shall still need the dirt farmer however mechanized he may become—and we shall still have to have decent politicians and wise as well as responsive government.

Perhaps in that way, in this dawning age of space conquest, the world can be saved from destruction by satellite stations or guided missiles in the hands of misguided men.

Report on the Canner-Grower Program

By P. K. Shoemaker,
Chairman, Canner-Grower
Coordinating Committee

Some people think of the canner as a food manufacturer with his problems and relationships the same as those of other manufacturers. The analogy is reasonably accurate insofar as his dealings with many of those with whom he comes in contact are concerned. The canner's relationship to his supplier of raw material, however, is considerably different from that of any other type of manufacturer. In other industries the raw material supplier may sell to a large number of fabricators or manufacturers. They may be able to produce the raw material according to the specifications of each of those manufacturers. The fruit or vegetable producer, for the most part, sells to only one canner. His problem of producing in accordance with that canner's specifications is very important in the whole marketing process, but it is a very different problem from that of producing nonfood products for manufacture. In fact, in the canning industry the relationship between the canner and the supplier of his raw material takes on aspects that are unknown and to a considerable degree not understood by manufacturers in other industries.

Many years ago, John Ruskin wrote a remarkable paragraph which could be applied to our problem:

"It is unwise to pay too much but it is unwise to pay too little. When you pay too little you sometimes lose everything, because the thing you bought was incapable of doing the thing you bought it to do. The common law of business balance prohibits paying a little and getting a lot. It can't be done. If you deal with the lowest bidder, it is well to add something for the risk you run. And if you do that, you will have enough to pay for something better."

Nothing is expensive if you get your money's worth.

The canner is, in fact, a part of the industry to which his supplier belongs: agriculture. While it is true that the canner's job is distinctly different from that of the grower of canning crops, their two jobs tend to merge into each other to such an extent that there is in some cases no definite line of demarcation between many separate and distinct jobs within the canning and growing operation, each of which requires a specialist to do. When you put all of these specialists to work at their respective jobs and they each understand and appreciate the importance of the contribution they are making, there is in reality a well integrated team that should be very effective in the marketing of perishable fruits and vegetables through the canning process.

The efficient, smooth operation of such a team depends in large part upon helping the individual to appreciate the importance of his contribution, a contribution which is effective only as long as the team itself operates smoothly and efficiently. One of the most important factors that contributes to this efficient operation is the development and maintenance of a line of communications among all persons involved.

It is recognized that all integrated operations must be managed in order that the various functions are coordinated. It necessarily follows that there must be those who plan and those who carry out the plans. This means that there must be those who give direction as well as those who perform the jobs. Each has his own contribution to make and should be made to feel that that contribution is important, and furthermore he should be allowed to perform that job without infringement from any of the others. This applies to all of the persons involved in the growing, processing and marketing operations.

Good communications alone will not insure success. The individual performer cannot be expected to put forth his best effort merely because he realizes the importance of his job and that others likewise recognize his importance. He must also be satisfied with the income that he receives from his work. The farmer who directs a number of operations in the process of growing the raw material must appreciate the value and indispensability of the jobs performed by the canner and have confidence in the efficiency with which those jobs are performed. But, regardless of the high regard he may have for the canner and the canner's work, he must also be convinced that the canner is treating him fairly in all of their dealings. If the farmer who grows canning crops has the proper economic appreciation of the need for cooperation with the canner, and if he has respect for the manner in which the canner is performing the job of processing and marketing the crop, and considers the price for his canning crop to be all that this combined operation can provide for him, then there should be no desire on the part of the grower to ask for marketing legislation or to seek any other outside assistance in his dealings with the canner.

The Board has directed the Association to develop a program that will help to bring about these objectives. Such a program has been set up and a number of N.C.A. committees as well as the N.C.A. staff have been working on their respective jobs within this program.

I would like to emphasize again the fact that only the canner himself is in a position to maintain good working relationships with his growers. The National Canners Association can outline programs of action, can prepare data that the canner may use in talking to his growers, and can assist the canner in a number of other ways. This Program does not call for the professional touch—it is a do-it-yourself program.

Your committee wishes to stress two important points: (1) The canner-grower relationship is not a seasonal problem but requires a continuous program and (2) that you as top management of your own companies will determine your own policy and practices. We, gentlemen, will get out of this program only just as much as we put into it.

Progress to Date

I have been asked to report to the Board some of the details of organization of this program, together with some of the progress that has been made in carrying it out.

Following the Board of Directors meeting last May, two jobs required immediate attention: (1) to develop the canning story, and (2) to organize the job of merchandising the story and to make staff assignments to carry out both these assignments.

The N.C.A. staff has spent a great deal of time collecting material to be used in connection with the canning story. Many articles have been written by people within our industry, by editors, and by college and experiment station personnel on the various economic phases of agriculture. These articles and reports will be utilized for special issues to go out to canners from time to time for their use in their own growers program.

The N.C.A. staff has been assigned to work with various organizations in merchandizing the canning story. Mr. Campbell addressed a number of state and regional conventions on the subject of canner-grower relations, and other staff members have this winter attended meetings of the Farm Bureau, the Vegetable Growers of America, and the National Junior Vegetable Growers Association. Staff members have also met with government officials in Washington and with Farm Bureau and vegetable grower organizations in several of the states during this past year. Drs. Stier, Mahoney and Crosby will attend most of the canners schools this winter and spring and will stress the importance to fieldmen of carrying this canning story to the growers and illustrating how the material furnished by the Association can be utilized at the grass roots level in the canner's own program.

The first of January a letter was sent to all fruit and vegetable canners pointing out that certain raw product statistical information will be made available for the use of fieldmen in order to enable them to intelligently discuss agricultural problems with their own growers. The same letter included an order sheet to enable the canner to request as many inserts as he desired for inclusion in the fieldman's handbook. These data are available for 10 vegetable crops for canning and 12 fruit crops which are utilized for canning. I should like to say that the early response requesting these inserts for the fieldman's handbook has been exceptionally good. The physical task of preparing this material has been rather strenuous on the staff getting ready for the Convention, but through the cooperation of everyone concerned, the task will be completed by the time this Convention is over.

At this Convention the Raw Products Committee, the Canner-Grower Coordinating Committee, the Technical Advisory Committee to the Raw Products Committee, and the Consumer and Trade Relations Committee will meet jointly to evaluate further the type of data and information which should be supplied to fieldmen. Gentlemen, this Wednesday meeting will be a working session. These four committees will meet to review in detail what has been developed and consider the type of additional information which could be made available to canners for their own individual program.

This program will continue to develop throughout the year and I think it should be pointed out that a strong Canner-Grower Relations Program is a necessity and must be worked upon each month of the year. Your Canner-Grower Coordinating Committee very strongly urges all the canners to participate in this Program in order that we may enjoy the opportunity to obtain our raw products in a free agriculture.

M. A. Clevenger Receives State Secretary Award

M. A. (Mac) Clevenger, executive vice president of the Canners League of California, was presented the second annual meritorious service scroll awarded by the *Canner and Freezer* magazine.

Mr. Clevenger was named for the award this year in recognition of his leadership in the Canners League's foreign market development program, public relations, and research activities.

Mr. Clevenger directed the production last year of the Canners League film "Abundantly Yours," which has already had 1,700 showings in 36 states. Also, he is chairman of the Industry Committee for Evaluation and Control of Sweat Damage, a cooperative research project at the Stanford Research Institute, with 34 sponsors representing canners, can manufacturers, fibre and corrugated container firms, label firms, and the port and terminal industries of the Pacific Coast.

The award is presented annually to the association secretary in the canning, freezing, pickling or preserving industry who best exemplifies the importance of association work for the well-being of the industry that he serves.

The award was presented to Mr. Clevenger at the annual meeting of state and regional secretaries on January 19.

The Status of the U. S. Army Ionizing Radiation Center Program

(at the Research Smoker)

By John T. Knowles,
Irradiated Products, Inc.;
Former Chairman, N.C.A.
Scientific Research Committee

The possibilities of utilizing the various forms of ionizing radiations in the preservation of foods has been given a good deal of publicity in recent years. As could be expected with such an intriguing subject, many of the popular publications have glamourized it and made rather optimistic predictions to the effect that ionizing radiations would soon revolutionize food processing methods.

The capital investment, complex equipment necessary for the application of the rays, the type of personnel necessary to implement the processes and the rather detailed and prolonged testing requirements to obtain Food and Drug approval for selling irradiated foods to the public have deterred any single food processing company from going all out and starting to irradiate foods commercially.

Research in the field of irradiation of food has been conducted over the past several years under the direction of the Army Quartermaster Corps in cooperation with the other agencies of the Department of Defense, the Department of Agriculture, the Atomic Energy Commission, and more than 70 industrial and educational institutions.

Research thus far conducted under the direction of the Army Quartermaster Corps has established the feasibility of utilizing nuclear emanations, such as gamma rays and electrons, instead of heat, to kill or inactivate micro-organisms which are responsible for food spoilage. The ultimate military and civilian advantages of the process include a reduction in refrigeration requirements, reduced food losses, improved control of certain food-borne diseases, and a wider availability of fresh foods under field conditions.

The Quartermaster Corps has been and is supporting a tremendous amount of research on the specific effects of irradiations on food. While much information is now known and some applications look very promising, every manufacturing process must be critically evaluated on the basis of careful study of the facts. And there are many facts in the preservation of foods by irradiation which are still not known.

It is primarily because of this situation that Irradiated Products, Inc. (IPI) now exists and is assisting the Quartermaster Radiation Planning Agency which is a division of the Quartermaster Research and Engineering Command, Quartermaster Corps, U. S. Army.

Many of you may have read the official press release announcing that "A contract for the production planning of facilities for the U. S. Army Ionizing Radiation Center to be built at Sharpe General Depot, Lathrop, California, has been awarded to a new firm named Irradiated Products, Inc."

Irradiated Products, Inc. is an independent industry group with headquarters at 250 Park Avenue, New York City.

It was formed by four companies representing major areas of the food business for the purpose of undertaking this irradiation enterprise. The companies are Armour & Company, Chicago; Continental Can Co., Inc., New York; Food Machinery & Chemical Corp., San Jose, California; and General Foods Corp., New York.

IPI officers are: President—Udell C. Young, vice president of General Foods; Vice President—Victor Conquest, vice president of Armour & Co., and a member of the N.C.A. Scientific Research Committee; Secretary—Arno M. Wiese, assistant to vice president of General Foods; and Treasurer—John N. Carty, assistant treasurer of Continental Can Co., Inc.

The announcement released by the Defense Department stated: "Operation of the Ionizing Radiation Center will combine industrial knowledge and experience in plant design and food processing with the scientific knowledge developed by the Army's extensive research program in food irradiation. The Army program is currently administered by Headquarters, Quartermaster Research and Engineering Command, Natick, Massachusetts, which will direct operations of the Radiation Center.

Production planning for the Center will include the development and review of plans for the plant layout, space allocations for various functions, work-flow diagrams, production methods and practices and cost studies.

Purpose of Irradiation Center

Key IPI personnel and Production Planning Team members have been briefed by QMRPA on the problems involved in the first five production planning tasks. They have also been given a more detailed definition of the purposes of the USAIRC than appeared in the proposal for bids. This detailed list of purposes should be of special interest to you so I will quote them as follows:

"(1) To provide a prototype pilot production plant to determine the feasibility of mass production of irradiated foods at an economical cost.

"(2) To determine which specific foods or other items should be irradiated by electron bombardment and which should be treated by gamma rays for the most effective and economical preservation, with due consideration being given to the nutritive value and acceptability of the food in each case.

"(3) To provide a supply of irradiated foods for use by the Surgeon General in testing the effects of irradiation on the nutritive values of food, and for use by the Quartermaster General in testing acceptance and palatability.

"(4) To develop a more nutritive, acceptable, and better-quality diet for combat troops at a lower cost.

"(5) To develop products which will increase mobility and capability for sustained operations by all military services. In order to keep pace with new concepts of ground warfare, a ration is required which will adequately sustain troops for extended periods and at the same time result in a minimum of handling, refrigeration during shipment and storage, and food losses. Use of food preserved by radiation is expected to solve many of these problems.

"(6) To develop and promote interest and participation of industry in the food irradiation process, as demonstrated in the pilot plant operation, so as to foster rapid take-over by the food industry.

"(7) To provide irradiation services to Department of the Army agencies for various investigations in both food and non-food developments."

Construction of Irradiation Center To Begin in 1958

Construction of the Center is expected to begin in 1958. The Center will consist primarily of a food processing plant utilizing an electron accelerator, to be constructed for the Army Quartermaster Corps by Varian Associates, Palo Alto, California, and a gamma ray source, the design of which is not yet decided. It is anticipated that about 150 employees will be required to operate the Center during the first year of operation and approximately 250 employees by the second year.

It is contemplated that this Center will have a capacity of irradiating a volume of food (consisting of approximately 25 different items) of 250 tons per month (3,000 pounds per hour) 40 hours per week during the first year. This tonnage on a two-shift basis will be increased to 500 tons per month the second year.

It is expected that this amount of irradiated food will be adequate for the wholesomeness studies, the process development studies, and the large-scale acceptance studies necessary to prove commercial feasibility.

Preliminary Planning Well Under Way

The Quartermaster Radiation Planning Agency had already done a considerable amount of work on preliminary plans for the center before the contract for the Planning Phase was awarded. IPI activities to date consist of conducting a review and furnishing interim reports covering our evaluation of five specific tasks, briefly described as follows:

(1) Review and evaluation of food processing criteria and development of manning and organizational requirements therefor.

(2) Review and evaluation of laboratory criteria and development of manning and organizational requirements therefore.

(3) Review and evaluation of labor, equipment and space requirements for plant maintenance and repair functions for the U. S. Army Ionizing Radiation Center.

(4) Review and evaluation of labor and space requirements for plant administrative functions for the U. S. Army Ionizing Radiation Center.

(5) Review and evaluation of adequacy of engineeringg design and construction criteria for the USAIRC.

To aid in the review and evaluation of these five specific Production Planning Tasks, the QMRPA has developed and furnished IPI with documents covering statements of criteria as follows:

Description brief on the design and operating concepts, food processing criteria, laboratory criteria, and engineering design and construction criteria.

As listed in the scope of work Phase I for the Production Contractor, there will be varied items to be performed. These will range from review of already established criteria, as mentioned above, to development of new or additional criteria, methods, programs, equipment lists and/or designs, production procedures and manuals.

These Production Planning Tasks will be subject to review and revision as the program moves forward. But we must keep in mind at all times that the Defense Department has directed that the USAIRC be constructed in accordance with the present austerity program and within the authorized budget limitations. We are informed that these limitations will require the maximum economy in establishment of design and construction criteria and in the actual construction of the center. The four stockholder companies *can* and have furnished experience in recent large-scale construction which was very helpful to the Production Planning Teams assigned to the problem of reviewing and evaluating the Engineering Design and Construction Criteria for the Center.

A Prototype Production Plant

Another guideline which IPI must keep in mind is that the Center is not intended to be a basic research establishment. Rather it is to be a prototype production plant. Processes previously pioneered through the research and development phase may be put into pilot production to the extent necessary to provide adequate quantities of irradiated foods for the Quartermaster Corps Radiation Preservation of Food Program.

The Center is expected to provide production and cost data from which the commercial feasibility and economics of food irradiation may be established. It will process a variety of different foods including fruits and vegetables, meats and poultry, marine products and dry-food products.

Irradiated Foods in Army Combat Feeding

Steps are under way to develop a new Army concept for feeding combat personnel. The present concept includes the preservation of raw as well as fully prepared foods by irradiation. It is foreseen that radiation preservation may contribute to future military operations in many ways. For example, it is possible that the amount of fresh food for the combat soldier could be increased. Refrigeration would not be necessary and the food would be preserved longer. Doing away with refrigeration in battle areas would constitute a significant contribution toward better mobility of the armed forces.

This brings you up to date on activities since the award was granted.

In closing I will quote a statement by Representative Sterling Cole, member of the Joint Committee on Atomic Energy. He said:

"It is my feeling that food preservation offers the most promising, glowing, happy prospect for the peaceful use of atomic energy of any of the others to the various peoples throughout the whole world. So I am anxious for you folks to get along with your program just as fast as you can, both by way of proving that the irradiated foods are not harmful and by way of showing how cheaply they can be irradiated."

That statement sums up my feelings. I can assure you that the Quartermaster Radiation Planning Agency is doing everything practical under an austerity program to meet a time schedule which will insure operation of the USAIRC by June 1960. From actions I have observed since November 4, you can rest assured that IPI will do its part.

Publicity Activities at the Convention

A Press Room and Duplicating Room were maintained by N.C.A. during the Convention for the benefit of some 100 representatives of press, radio, TV and other media covering the events.

Copies of 21 Convention speeches were available there along with 12 special news releases written by the Information Division and writers of the D.A.Y. staff during the Convention and 16 that had been issued from Washington previously. Photos and biographies of speakers and officers were made available and the Information staff assisted reporters and cameramen with background information and in other ways. The staff also supervised the taking of news photos of Convention personalities, events and atmosphere, and captioned these for release at the Press Room. Special mailings were made to publications unable to personally cover the event.

Press Conferences

Special Press Conferences were arranged for the guest speakers at the Opening General Session; one for Roscoe Drummond in the headquarters suite at the Traymore immediately preceding the program; and one for Bernard M. Shanley at the speaker's platform just at adjournment.

Radio and TV

The N.C.A. Convention was saluted by Doug Edwards on his news telecast, Friday, January 17, over the CBS-TV network, under sponsorship of the American Can Company. Also, radio station WIP, Philadelphia, honored the Convention on Frank Brookhouser's news program "Frankly Speaking," January 20. Convention features also were broadcast on the program *The McCanns at Home*, over New York station WOR, and *City Food Guide* by Mrs. Frances Foley Gannon over New York station WNYC.

Speech by George Steele

George Steele, Jr., Director of the Fishery Products Division, represented the N.C.A. at the Atlantic City Lion's Club luncheon on January 21, speaking on the threat to American fishing arising from efforts by certain Latin American countries to extend their territorial waters from 3 to 200 miles.

Convention Proceedings

(Concluded from page 16)

another change in procedure was to place the installation of officers ceremony at the close of the Second General Session, and 1958 President Burns therefore served as chairman of the closing session.

Opening General Session

The Opening General Session on Monday, January 20, dealt with national and world situations and their likely effect on canning industry operations. Quoting from facts collected by the Division of Statistics, President Brown cited a number of situations that could contribute to a more favorable canned foods outlook for 1958: strengthening of demand, additional spending for defense contracts, the year-end employment situation, and a year-end purchase ability and attitude on the part of consumers.

Guest speakers for this session were Roscoe Drummond, well-known syndicated columnist of the New York Herald-Tribune, who reported and analyzed the "State of the World" and answered several questions from the floor, and Bernard M. Shanley of Newark, N. J., who brought greetings to the Convention delegates from his home state and spoke on the subject "Inside the White House," drawing from his years of service as President Eisenhower's counsel and appointments secretary.

It was at this session also that Chairman George B. Morrill, Jr., of the Nominating Committee brought in the slate of officers and directors for 1958, and the election of E. E. Burns of Alton, N. Y., as President and Norman O. Sorensen, Milwaukee, Wis., as Vice President and continuation of Carlos Campbell as Executive Secretary for his 13th consecutive year was unanimously voted.

Chairman Robert E. Friend of the Resolutions Committee read and moved adoption of the Convention Resolutions (reproduced on pages 20-21). Important among these was one dealing with the community of interest between grower and canner, and in fact, the Canner-Grower Relations Program received considerable stress at various stages of the Convention. It was the subject of a major address to the Board of Directors on January 19 by P. K. Shoemaker, Chairman of the Canner-Grower Coordinating Committee, and of a special working conference January 22 of four N.C.A. Committees—Raw Products, Technical Advisory to Raw Products, Canner-Grower Coordinating, and Consumer and Trade Relations.

Marketing Session

The new officers were installed at the close of the Marketing Session January 21. President Burns and Vice President Sorensen spoke briefly on taking office, and the 1958 Finance Committee was appointed by President Burns.

Opportunities for increasing sales of canned foods were discussed by four experts at the Marketing Session: A. C. Nielsen, Jr., president of the A. C. Nielsen Company; James A. Weaver, president, James A. Weaver Company; Commander Edward Whitehead, president of Schweppes (U.S.A.) Ltd.; and Esther Foley, home service director, Macfadden Publications, Inc.

At this session also, President Brown presented a special award to Paul J. Cupp, President of American Stores Company, in recognition of his contribution of facilities and advice in the conduct of the Philadelphia Project. This entire session is reproduced from pages 28 to 40.

Special Visit of Food Editors

The Food Editors Conference, an annual project of the N.C.A.'s Consumer and Trade Relations Program, was this year tied into the Marketing Session. The 50 representatives of newspapers, magazines, radio and TV from New York, Philadelphia, Baltimore and Washington were brought into Atlantic City Monday night to enable them to be in the audience at the Tuesday morning Marketing Session. Immediately following that session they attended a reception at the Shelburne Hotel where they mingled with canners, including especially the membership of the Consumer Service and Consumer and Trade Relations Committees. Miss Katherine R. Smith, Director of the Consumer Service Division, was the principal hostess, aided by personnel of her Division and of Dudley-Anderson-Yutzy, N.C.A. public relations counsel.

Official greetings were extended by Executive Secretary Carlos Campbell at luncheon, following which the Food Editors, escorted by members of The Forty-Niners, became guests of the Canning Machinery and Supplies Association at the Exhibit in Machinery Hall. They were given a guided tour of the Exhibit with special stops at the White Cap Company booth and a talk by President John Swift of C.M.&S.A.; at the U. S. Steel booth to see that special canning industry exhibit; and at the canned corn sample display at The United Company booth, with a short talk by Mrs. Edna Cover.

Research Session

With President-elect Burns presiding, the final session on Wednesday morning, January 22, was given over to scientific research. As Mr. Burns stated in opening the proceedings: "We are affected in many ways by research, not just by research on our own processes and products but research that guides the ideas and habits of those from whom we buy and those to whom we sell."

Dr. Emil Mrak, well-known food technologist with the University of California, urged canners to develop a complete program of integrated research considering all factors influencing the processed food from the field to the consumer. J. Jerome Thompson, vice president of Chas. Pfizer & Co., Inc., stated that both basic and applied research are essential to the long-term success of any business or industry and likewise advocated more attention to research in agriculture for the development of crops of better and more uniform quality. A third speaker, Dr. Robert E. Olson of the Pittsburgh Medical Center, reported on research on the relationship of atherosclerosis and fat intake. Reproductions of all these papers may be found on pages 41 to 48.

Supplementing the addresses and presentations on the three general Convention sessions was a series of technical luncheons, breakfasts, smokers, and conferences for specialists in various canned foods activities. These included a Fishery Products Luncheon and Research Technical Luncheon on January 20; Raw Products Technical Luncheon on January 21, and a Research Technical Luncheon on January 22. The Research Technical Luncheons were co-sponsored by C.M.&S.A. When available, the papers presented at these technical meetings are reproduced in this issue.

N.C.A. Films Shown Throughout Convention

N.C.A. operated a Film Theater in the Traymore Lobby Sunday through Tuesday during the Convention. There were continuous showings of Association-produced films and film strips, and an estimated 600 attended.

This was an effort by the Consumer and Trade Relations Committee to encourage more use by N.C.A. members of picture materials the program has produced. The films shown were "The Three Squares," produced two years ago; the two farm youth films produced last year—"Dear Eddie" and "The Story of John Porter;" two trade relations items—"The Real Profit Story" (dealing with handling costs of canned foods) and "Seasonal Patterns in Retail Sales of Canned Foods," a graphic presentation of Report No. 3 of the Philadelphia Project; and the newly-revised film strip, "Those Blasted Canned Foods," portraying the importance of canned foods in civil defense.

Each canner visiting the Theater was given a special kit, prepared by the Information Division and the staff of Dudley-Anderson-Yutzy, which contained descriptions of the respective films, their specifications, recommendation of the best ways to use them and most desirable type of audience, and details on how to order prints for showing. Order postcards were supplied for immediate use.

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